THE STORY OF

PLANT LIFE IN THE BRITISH ISLES

TYPES OF THE COMMON NATURAL ORDERS

INTRODUCTORY VOLUME

BY

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FRONTISPIECE.

W. Bell. WHITE BIRCH. *See page* 195.

PREFACE.

THIS little book is intended to give the beginner or the student of Nature Study a brief but clear insight into the characteristics of the better-known orders of British Wild Plants. As there are nearly a hundred orders, the difficulty of obtaining a knowledge of all at first is a deterrent, which can be obviated by making a study of the more widely distributed and more familiar orders.

Reference can easily be made to more comprehensive works for the purpose later of becoming acquainted with the rarer representatives of the orders. And these will also be dealt with in a forthcoming work (in two volumes) in this series to be published very shortly.

In the same way *common types* of each order have been chosen, so that it may be possible in any district to study the plants here described.

The method of description is, moreover, I venture

to hope, an advance upon previous works of this kind. I have endeavoured to give briefly a connected account of the essential phases of life-history in each case. The *life of the plant* is in this way revealed at the stage when such interesting features most attract—the beginner's stage. The "drier details" which usually find a place in works intended to give a general survey of the orders of plants in their natural arrangement are further described from the same standpoint, from a desire to bring the student *into the field* to study, not only the plant's characters, by which it is recognised and identified, but also its ways and means of earning its livelihood, of carrying on its race, and so on.

The introductory chapter also sums up generally the principles underlying the main facts of the life-history thus set forth.

The writer's experience in a public institution has shown that those who are interested to-day in plants (or animals) do not merely wish to know the name of a plant, or how to identify it—though, if this can be done on broad principles, they are eager to learn—but they want to know the details of *how and where and when it grows.* Hence the method adopted in this book.

For revising the proof-sheets and many helpful suggestions I am much indebted to Miss C. E. C.

Measham, Science Mistress of the Wyggeston Girls' School, Leicester.

I would draw attention to the excellence of the illustrations, which, as photographs of the actual plants, in many cases in their natural haunts, will be invaluable as an aid to identification, each plant being thus illustrated.

For these I am much indebted to Messrs. C. A. Allen, W. Bell, H. A. Cox, J. H. Crabtree, F.R.P.S., Stanley Crook, the late G. B. Dixon, F.E.S., Carl Edwards, F.N.P.S., T. R. Goddard, B. Hanley, Charles Mosley, F.E.S., whose skill in this department of photography cannot be surpassed.

A. R. HORWOOD.

LEICESTER MUSEUM.

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THE STORY OF PLANT LIFE
IN THE BRITISH ISLES

INTRODUCTION

THE HABITATS OF PLANTS.

DURING the last decade much headway has been made with the study of plants in their natural surroundings or their habitat. And a new science, ecology, has arisen, which bids fair to revivify the old systematic botany, which had fallen into such disrepute, by allying itself with that branch of botany and raising the study of plants from the systematic standpoint to a higher level.

Considering the centuries that have been devoted to systematic botany or the study of the characters of plants and their relationship to each other, it is indeed to us, in these enlightened days, marvellous that the life of the plant, which includes a study of its habitat, its manner of association and relationship to the character of the surroundings, had not been considered at all in detail until quite recently.

But it is now recognised that the physical surroundings play a great part in the shaping of species, apart from their diversity and the fact that these diversities are correlated with plant distribution and plant variation.

If, indeed, we can determine the requisite surroundings of a plant we can more surely discover it. And as a great part of geographical botany is concerned with the discovery of the exact distribution of plants, it is highly valuable from this point of view alone.

But this is not all, for we learn from the character of the surroundings its requirements as regards light, heat, moisture, altitude, soil, etc., and the manner in which the plant occurs, either in small communities, large ones or otherwise, helps us to obtain a much broader and more intelligent view of the vegetation of a district, or its physiognomy on a large scale, which in turn reveals to us the bases of scenery and landscape. So that here the painter or the poet may join in the study of botany from a really vital standpoint.

In general plants are most largely affected by three factors, though there are others which are connected directly or indirectly with these three main factors.

These are climate, altitude, and soil.

England and Wales, Scotland and Ireland, do not differ very markedly in climate compared with such differences as are expressed in the zones of climate, frigid, torrid, etc., into which the world may be

divided owing to its configuration and the relation of its axis and movements to the sun, the source of heat, and of temperature, winds and rain.

But one may locally consider that the north differs from the south, the west from the east. This is reflected, in fact, in the flowering seasons of the same plant at the extremities of these islands north and south.

The north is much colder relatively than the south, owing to latitude ; the west much moister than the east owing to the influence of the Atlantic and the Gulf Stream.

So that we may distinguish different types of plants in the north, as defined by Watson, Scottish plants, and in the south English types, whilst in the west we have Atlantic types, and in the east Germanic types. These different types depend upon other factors, but climate is also largely responsible for the differences in the plants in the north, south, west, and east of the British Isles.

Next to the influence of climate comes that of altitude, which has a result similar to the former, caused by the greater cold as one travels from south to north, whereas in this case the heat decreases as one ascends vertically.

The hills and mountains in this country do not exceed 4000 ft., so that the contrast is not so marked here as on the Continent, where the altitude is 15,000 ft. or over, and alpine plants flourish on the summits.

None the less at the top of Ben Lawers and similar mountains in Scotland arctic alpine plants grow, and there is a typical vegetation of Saxifrages and kindred plants. Up to the altitude of 1000 ft., moreover, wheat and other crops will grow, and this zone of cultivation marks the limit of certain plants that also cannot exist at higher altitudes.

Between 1000 and 2000 ft. there are the subalpine species, and above 2000 ft. the alpine and arctic species.

Hence altitude may be said to affect plants and their distribution.

Much, again, depends upon the nature of the soil. The soil with the subsoil is derived from the rock beneath, and of such rocks or geological formations there are a great number, but the soils resulting from them may be resolved into half a dozen types.

There are clays and loams, coarse sandstones and sands, siliceous rocks, limestone and chalk, peat, humus, and saline soil.

As a whole each soil is found to be characterised by the occurrence of a certain type of tree which forms a natural plant-formation, with a scrub and ground flora peculiar to it. Thus on clays and loams the pedunculate variety of the Oak is found, with a coppice of Hazel below and associations (that is, smaller communities of plants than the plant-formation), of Bluebell, and later Bracken, with smaller societies of other plants, such as Wood Spike Rush, etc. And on limestone or chalk there

is a typical woodland of beech, the scrub and ground flora being often *nil*, as the shade is so dense.

The Flowering Seasons of Plants.

Something has already been said as to the influence of latitude upon the flowering seasons of plants in reference to the effect of climate upon plant habitats and distribution.

Not only does the latitude cause a difference in temperature independently of the season, but the cycle of the seasons which is connected with the rotation of the earth and its revolution throughout the year round the sun has a similar effect.

Owing to the rotation of the earth upon its axis and the demarcation of each twenty-four hours into day and night, the temperature is markedly different at alternate intervals of the twelve hours, when day and night are equal, whilst in Summer the length of daylight is much greater than that of the night. This proportion is reflected not only in the amount of total heat in each of the seasons, but also in the character of the season as one goes from the equator northwards, or to the land of the midnight sun.

The four seasons recognised as Spring, Summer, Autumn and Winter again have marked characteristics, so that we can speak of Spring flowers, Summer flowers, Autumn flowers, Winter flowers.

And these divisions of the year are each characterised by a difference in the amount of light, heat,

and moisture. These factors being vital to plants, the seasons greatly influence plant-life.

Spring, generally speaking, is the period when life is renewed, when activity is stimulated, when the plants that prolong their life beyond the single year, or two years, and are perennial, begin to put forth again those aërial parts which are of so much importance in the nutrition, growth, with attendant assimilation, respiration, transpiration, etc., and reproduction of plants. Plants that are evergreen remain inactive during the winter to a great extent, transpiration being difficult. Deciduous trees and shrubs put forth anew their buds, and the shoots break forth into leaf, so that the carbohydrates derived from the carbon dioxide in the air by the action of sunlight upon the chlorophyll may contribute their part towards the well-being of the plant.

In the tree the sap begins to rise, and a fresh zone of wood is commenced by addition to the exterior in the Dicotyledons, to the interior in the Monocotyledons. Aquatic plants begin to struggle upward from the river or lake-bed towards the surface.

The sere grass begins to assume a green and fresh appearance. Already the bulbous plants that have stored up their reserves during the last year have begun before winter is over to put forth the leaves and bloom, so that they may flower in the woods before the thick cover of leaves shuts out the sun.

The summer months also have their part in the general advance of the vegetation of each season.

Now the seeds of last year's annuals, under the beneficent influence of the sun's warm, energising rays, aided by the reserve material supplied to the embryo by the endosperm, begin to commence an entirely new phase. They begin to grow and to put forth their leaves, to attain a stem and branches, lengthened each day, and as time goes on they flower and exhibit their gay colours to attract the insect life upon which for perpetuation (*i. e.* fertilisation and seed formation) they are so largely dependent. Whilst some plants can, after self-pollination, fertilise and mature their seed without this friendly assistance, others cannot, hence the tempting store of honey and pollen which is offered so hospitably to the wandering bee or hovering butterfly has its meaning to us in the aid they render the flowers by making cross-pollination a possibility.

In earlier phases of the earth's history, if summer dawned at all, there were no winged honey-porters, and the wind (as now in the case of trees in spring and other diœcious flowers) alone carried out this needed office.

The biennials, too, in their second season, begin during the summer to flower for the first time. Each summer month has its own particular flowers. Each flower requires its own particular amount of heat to come to maturity, to flower and to seed. Hence it is that all the flowers do not bloom at once.

This variety of requirements is for us all the more

wonderful, as it is all the more pleasing to us, than if every flower were in bloom at once.

Following the opening of the flowers in summer, and the mowing of the hay, the cutting of the clover, comes the ripening of the seed, the months of fruition, of autumn. Then all the fruits that have not ripened earlier, which are not numerous, save the Gooseberry, Currant, Cherry, Strawberry, etc., come to maturity, and the golden grain is swollen in the ear. Now is the time when blackberries are ripe, when the apple and the pear, the hazel, the plum, and all those numerous fruits that are so valuable to the orchard owner, the gardener, and the farmer, are at their highest state of perfection. Nature adorns herself in gorgeous tints of leaf and bloom to celebrate these gifts to Ceres.

This season of wealth, of the attainment of maturity, of success, is for us perhaps the most attractive, the most encouraging. There is little to wonder at in this. Man in his prime is then the most successful, and as we say, "Nothing succeeds like success."

But everything has its day, and lovely, comely autumn leads on to winter, not the "winter of our discontent," as Shakespeare somewhat pessimistically puts it, but the winter of our quietude.

For after autumn comes rest. The annuals and the biennials die down, the first to be perpetuated in the spring or summer by fresh plants, the second by a second year of growth and flowering. In the case

of the latter the stem and leaves usually die down in winter, their office performed, their services no longer required.

The perennials, too, since they will not renew activity till next spring, if herbaceous, die down to the root, which is protected from frost and cold by the earth in which it grows.

The leaves of the deciduous trees and shrubs fall off after their blazonry of autumn tints has faded and gone.

A corky layer is formed at the base of the petiole, and the leaf in due course falls, the scar left being already protected.

The evergreens are left as sole reminder that leaves play a great part in our landscape, as they do in the life of the plant, but during winter they are more or less dormant, like the hibernating dormouse or butterfly.

The Habits of Plants.

Two factors as a whole regulate the habit of plants—their requirements and the influence of one plant upon another, or the struggle for existence. In the first place the division of the earth into land and water at once causes a division of plants into land plants and water plants. Each of these main groups has a typical habit depending upon the character of the surrounding element.

Thus land plants are, as a rule, rigid, erect, with

distinct regions for root, stem, etc. The arrangement of the leaves upon the stem is adapted to the exposure of a large surface to the light and action of the sun's rays, and the conveyance of moisture to the roots, necessitating mosaic patterns, etc. The roots are necessarily adapted to terrestrial conditions, hence the different modifications of tap-root, fibrous root, rhizome, etc. These are a few features which are connected with the growth of plants on land.

In water the conditions are entirely different. There is no need for a rigid, erect stem, or for distinct regions for root, stem, etc. The habit is streaming, especially in the case of running water, the plant being limp and flaccid. The stems do not attain the dimensions or structure of trees, but are herbaceous, usually dying down in winter, though nearly all are perennial. But some have resting buds, or hibernacula enabling them to persist during the winter without dying down. The leaves are narrow, thread-like, exposing more surface proportionally to the light, but not continuously. There is no arrangement to convey water, but the upper and lower surfaces are modified to face the light, whilst their existence in water does not require of them the same conditions as land plants for transpiring or respiring. And the necessity of obtaining salts from the water introduces new conditions, though these do not affect habit.

Between these extreme types come the non-erect, trailing or prostrate plants that rely upon a flat sur-

face for support. These, again, are of different habit according to whether the habitat is wet or dry. The division of water plants into entirely submerged, half-submerged, floating and littoral plants is connected with the derivation of land plants from water plants, since the latter were the forerunners of the former, though in one case the green algæ of the fresh-water were derived from one or more types of seaweeds pure and simple.

The trailing land plant is a water plant which has adopted a land existence. This may be shown from the manner in which aquatic plants may adopt an existence in a marsh where they are not wholly submerged, and finally, dry land conditions. There are many cases of land plants which have an aquatic variety, such as the Amphibious Knotweed, and the Buttercup Group has a batrachian section from which the land forms were derived.

Then, again, there are the plants that have gone a step further than the trailing or prostrate habit, and have adopted an erect but climbing habit. Not having accomplished the feat of becoming erect by unaided effort, they have to rely upon the support of other plants.

It is unlikely that they were at first erect and have adopted the climbing habit. There is the case of the Ground Ivy, which is a trailing plant, and the Climbing Ivy which clings to trees.

Many plants also have a prostrate form and an erect form, the latter probably derived from the first.

And amongst some plants one species is trailing or climbing, another erect, as in the Loosestrife group.

Amongst water plants, again, some are submerged below and erect above the surface, showing that the trailing or submerged habit is original, *e.g.* Water Violet.

Apart from the division of plants into land and water plants, there are groups that cannot live apart from others. Some of these are parasites upon the roots of other plants, *e.g.* Yellow Rattle, Eyebright, Bartsia on roots of grass, Dodder on the stems of Furze. Others live upon the nourishment of other plants, such as the Bird's Nest Orchis and the Coral-root.

In the struggle for existence the plant types that have been most successful have been the trees.

In former geological epochs they played a great part, so early that it is not possible to say whether the tree type was evolved gradually from other types or not. There are traces of lowlier types and aquatic plants as far back, so that their derivation is doubtless from earlier types of plants without the arborescent habit.

In the vegetation of the land, however, trees play a great part, and in the history of our own country it may be shown that England was once practically all forest. Hence we must consider that the other now widely distributed types of plants have become adapted to their conditions subsequently, whether

or not those conditions have demanded a different habit.

The tree habit conduces to an absence of a ground flora in many cases, such as in Beech woods. Next to the tree habit, the shrub or bush type is most successful. Both of these dominate the dispersal of plants that seek the shade. For there are shade plants and sun plants.

Under scrub or bush, or amid it, the sun plants can thrive where under trees they cannot. Scrub and bush are deteriorated forest land. And it is easy to see that the plants of the open, except alpines and cliff and aquatic plants, have come to adopt their present habit and habitats after being subjected to this intermediate scrub stage. The scrub, though dominant and wide-spreading, allows the herbaceous type of plant to struggle toward the light by adopting a pyramidal habit. Many plants that live under the shade of hedge or woods have this pyramid habit, being broader at the base and gradually narrowed upwards.

The rosette habit is a stage further, the plant having a rosette of radical leaves and a straight, erect stem.

Lastly, there is the grass habit—a third dominant stage. By having this slender habit large numbers of the same species can occupy the minimum of ground and still reach the sunlight amongst the other surrounding plants, and perform the necessary functions of life.

They are called definite as contrasted with the indefinite racemose types. Examples are St. John's Wort, Rockrose, etc.

Some others are of mixed type, the Labiates being racemose in primary branching, the lateral ones dichasial or cymose.

The flower is built up on a receptacle or torus, or thalamus, which bears the stamens and carpels, which are the most important in the reproduction of the plant and take part in the pollination and fertilisation which precede seed-formation.

Around these are arranged the protective and attractive perianth. This is made up of an outer whorl termed the calyx, consisting of a number of segments called sepals. The inner whorl consists of the generally coloured corolla with petals varying also in number. In some plants the perianth is wanting, and the plant is termed apetalous. The different types and their arrangement are described under the headings for each chapter.

When the stamens and carpels are upon the same plant it is hermaphrodite or bisexual; when on different plants the inflorescence is unisexual, the male plants being staminate, the female pistillate.

In the former type the female flowers are usually above the male.

When the stamens and carpels are found in the same hermaphrodite flower it is monoclinous, when in separate plants the flower is diclinous. When male and female plants are both borne on the same

plant they are monœcious. When they are on separate plants they are diœcious.

The perianth members may be free and not united, when they are polyphyllous. If those of the calyx are free it is polysepalous; if the corolla segments are free it is polypetalous. If the carpels are free it is apocarpous. If the perianth members are united it is gamophyllous, etc., and if the carpels are united it is syncarpous. When the stamens adhere to the carpels it is gynandrous, to the corolla, epipetalous, to the calyx, episepalous, etc.

When the carpels are above or superior the parts below are hypogynous, the carpels being borne on a disc or other structure.

When the carpels are below and the other parts are on the rim they are perigynous, the carpels still being called superior.

If the ovary is inferior and the other parts are above it they are epigynous.

When a flower is provided with a perianth it is termed chlamydeous, when it has none it is achlamydeous.

If there is but one whorl in place of two it is monochlamydeous or incomplete, and if there is no corolla it is apetalous.

The perianth, when united, forms a tube with free teeth, lobes, or segments, which form the limb. The perianth may be regular or irregular. When it falls in the bud it is caducous, after fertilisation deciduous. If it is not lost it is persistent.

anthers are large. The stamens also ripen together. The pollen is dry, and to protect it from rain the anthers open only in dry weather. Bracts in the catkin-bearing trees protect it above. The stamens in the Nettle group are folded up till ready to burst, and do so explosively. The pollen in the catkins is blown by the wind by the looseness of the catkins. Where the plant does not ripen its pollen before the leaves, as in Grasses, the gregarious habit is an equivalent aid to the effective pollination of the plant.

The pollination of flowers by insects is called entomophily. It is the most general method. All classes of insects take part in pollinating flowers. The higher classes visit the higher plants.

Insects first learnt to find flowers were food-supplying by their scent, and the honey and pollen were discovered subsequently. These gifts to the bees, etc., are the prices paid for pollination.

The object of this is to secure cross-pollination. For it is found that plants that self-pollinate themselves are not so strong and healthy as those that are cross-pollinated. And, in fact, the pollen of some plants is sterile when applied to the stigma of the same plant.

Flowers conceal the honey in their nectaries so placed that pollen is collected in the act of seeking it, whilst some insects seek pollen specially. Special devices, such as hairs and a hooded corolla, etc., are provided to protect the pollen from rain, flies, etc.

The flower is conspicuous in order to attract insects, or its attractiveness we may say results in the visits of insects.

The occurrence of male and female flowers on different plants is of course again a device for preventing autogamy or self-pollination. In order to effect cross-pollination, which is necessary in this case, insects must transfer pollen from one plant to the stigma of another.

Another device is the ripening of flowers, where male and female are on the same plant, of the anthers and stigma at different times (dichogamy). In the one case the anthers may ripen first, when the flower is proterandrous, in the other the stigma may do so, when the flower is proterogynous.

If in such flowers both ripened together in the absence of insect visits there would be self-pollination unless the anthers were so placed that a visit by insects was necessary, or the anthers were turned away from the stigmas when ripe. Even if insects visit such flowers when the female and male elements were ripe together (homogamous) there might be self-pollination again unless the mechanism of the flower prevented this. If the male and female flowers are on the same plant but not in the same flower there is more chance of cross-pollination than if they are on different plants, as so much more pollen is required for the certain crossing of male and female flowers.

Some plants, again, have more than one type of

flower, and if there is a long and short style, as in the Primrose, it is dimorphic; if there is an intermediate type also it is trimorphic, as in Purple Loosestrife. This requires the transfer for effective pollination of pollen from a long-styled form to a long-stamened form, and so on. By this means the possibility of self-pollination is minimised. This is called legitimate pollination; whilst if a long-stamened and short-styled form are crossed the pollination is illegitimate.

There are other methods by which the pollination of the flower is rendered effective, described under each species, such as piston movement in Ulex, etc.; loose-pollen forms where the pollen is dry and in a box arrangement, as in Eyebright; porous anthers, as in Heath; trap-flowers, as in Arum; cleistogamic flowers, as in the Violet; honey guides or spots on flowers to guide to the honey. Some foreign plants are pollinated by animals, such as snails, bats, humming birds.

Most water plants are pollinated by insects or the wind. But a few, such as Elodea and Vallisneria, do so by pollination at the surface by aid of water, whilst in Ruppia and Grass-wrack this is accomplished below the water.

Plants and Seed Dispersal.

When the flower has been pollinated it is fertilised by the passage of pollen grains down the stigma and

style to the ovary, where the ovule is situated, and the ovum thus becomes fertilised. The seed thus elaborated undergoes with the enclosed embryo a resting period and later germinates.

But before this happens the flower must release the seed from its attachment to the parent plant, for some fall close to the latter and some are dispersed to a distance. It is obviously of advantage, owing to the intense struggle for existence, that the latter should happen. And as the means of dispersal of seeds are of exceeding interest, and a vital part of the life functions of plants, they are described briefly hereafter.

There are, of course, primarily large seeds and small seeds. The former are less likely to be distributed far except by outside agency, such as animals. Small-seeded plants, of which the bulk of the British plant types are composed, have their seeds blown to a distance by the wind, of course, and there are other methods of dispersal of these plants.

The ovule being enclosed in an ovary, after fertilisation a covering or protection for the seed, called the fruit, is formed.

The fruits are commonly termed seeds when the covering is meant, not the enclosed seed. The envelope which encloses the seed is called the pericarp. But the word fruit really includes covering and enclosed seed.

In order to understand the modes of dispersal some description of the types of fruits is necessary.

Brongniart, 1843, rejected the section Apetalæ, and he divided the Monocotyledons into two groups, according to the presence or absence of endosperm in the seeds.

In the system adopted by Bentham and Hooker, 1862 to 1883, the Dicotyledons are divided, following De Candolle largely, into Polypetalæ, Gamopetalæ, Monochlamydeæ. In the Polypetalæ they include Thalamifloræ, Discifloræ in which a highly staminiferous disc occurs, and Calycifloræ.

The Gamopetalæ are equivalent to the Corollifloræ. These are divided into Inferæ with the ovary inferior, Heteromeræ with the ovary superior, and Bicarpellatæ with the ovary superior and two carpels, whereas there are more than two in Heteromeræ.

In Engler's system, which is much used on the Continent, and more largely here now than formerly, the Monocotyledons are divided into ten cohorts and forty-seven natural orders.

The Dicotyledons are divided into two series, Archichlamydeæ and Sympetalæ, thus producing considerable rearrangement of Bentham and Hooker's system.

Eichler, whose system has been emended by Warming, divides Monocotyledons into seven cohorts, and Dicotyledons into two series—Choripetalæ, which equals Archichlamydeæ, and Sympetalæ.

The object of classification is to form an arrangement of plants on natural lines. It is not an aid to

identification. Therefore, before the botanist need concern himself with the details of classification he must become acquainted with the characters of the different families and orders, so that later on some idea may be formed as to the relation to each other or position in a series. The foregoing remarks, therefore, must be read after the details in Chapters I to V, describing the thirty common orders and sixty-two common species, have been mastered.

CHAPTER I

DICOTYLEDONS (NET-VEINED PLANTS)

THE primary division of all flowering plants called Phanerogams or Spermatophytes, because they produce seeds which possess structures termed flowers, and stamens or ovules, which become fertilised and produce seeds with an embryo, is into Angiosperms and Gymnosperms.

Angiosperms are characterised by having the ovules contained in an ovary, and thus differ from Gymnosperms, where they are naked, and where the seeds are not contained in a seed-vessel.

Angiosperms are again divided into two large groups, according to the character of the seed-leaves or cotyledons, viz.:

Dicotyledons (with two seed-lobes).

Monocotyledons (with one seed-lobe).

Dicotyledons may be described as plants with two cotyledons, the plumule arising between them, with stems with new wood increased by addition to the outside of the old wood, hence the old equivalent exogens, and a fresh layer of bark forms within the old bark. There is a pith, and the woody tissue

is in concentric rings, a ring denoting a year's growth.

The leaves in this group have the nerves also arranged in a network, or branched.

The flowers have the parts usually in fours or fives. Annuals and biennials do not have the same stem structure as perennials. There are exceptions to these definitions, as, for instance, the Ranunculaceous *Eranthis* has but one cotyledon, and some monocotyledons have the leaves net-veined, as *Arum*.

Dicotyledons are divided into four groups according to the character of the perianth. Thus in Monochlamydeæ or Apetalæ it is single or absent. In the three groups Corollifloræ, Thalamifloræ, and Calycifloræ it is double.

In Corollifloræ or Gamopetalæ petals are united.

In Thalamifloræ and Calycifloræ or Polypetalæ the petals are distinct, the former having the stamens hypogynous or situated below the ovary, the latter perigynous, or around the ovary, or epigynous, or upon the ovary.

Amongst Polypetalæ which possess both calyx and corolla (or Dichlamydeæ) with petals distinct there are some exceptions; thus in Ranunculaceæ, Meadow Rue has no petals, nor has Anemone, the sepals being petaloid, and there are no petals in Marsh Marigold, and amongst Crucifers, Cardamine, Wart Cress, Pepperwort are wanting in calyx or corolla, whilst there are apetalous forms of Violet, and

amongst the Caryophyllaceæ the Sandworts and Pearlworts do not all possess both, and amongst Rosaceæ, Alchemilla and Great Burnet, the Golden Saxifrage amongst Saxifrages, many of the Starworts, Purple Loosestrife group, and one of the Willow herb groups.

The petals also may be united or coherent in the Fumitory Group, Milkwort Group, Portulaceæ, Mallow Group, Holly Group, in Pennywort, and the White Bryony.

The *Thalamifloræ* all agree in having the petals inserted on the receptacle or thalamus, that is, hypogynous, being free from the calyx, or on a disc at the apex of the pedicel. The stamens being hypogynous spring from the base of the ovary, which is therefore here superior.

In the Waterlily and in some Pinks the stamens may be perigynous or epigynous.

The ovary or pistil may be apocarpous, consisting of one or more carpels distinct from each other as in Ranunculaceæ and Berberidaceæ, or be syncarpous, the carpels being united into one ovary as in most species.

The Buttercup Group.

A representative, such as the Buttercup, of the Order Ranunculaceæ, as the name implies, being derived from *Rana*, a frog, is usually to be found in a damp situation, the habitat of frogs, boggy ground, ditches, etc.

Amongst this order are included such plants as Clematis or Old Man's Beard, Meadow Rue, Anemone, Adonis, Mousetail, Hellebore, Marsh Marigold, Globeflower, Winter Aconite, Columbine, Larkspur, Monk's Hood, Baneberry. The first five and Ranunculus or the Crowfoot have but one seed in each carpel, whilst the rest have many, including the Pæony, which is a member of the order also.

They are, as a whole, herbaceous plants, but a few are shrubs, such as Pæony and Bear's Foot, whilst the Traveller's Joy is a climber.

They are found in all parts of Europe, and in countries around the Mediterranean, being confined mainly to temperate regions.

As a rule they have the leaves much divided, and have the rosette habit, or the trailing habit, in some cases as in Larkspur forming a tall and pyramidal plant.

There is one property of the Buttercup and Crowfoot which is very general, that is, their acrid or burning taste, and they are capable of serving as blistering agents, often acting upon cattle.

Some are caustic and even poisonous, as Monk's Hood. The Water Buttercups, however, are not so acrid, and on the banks of the Kennet are gathered and given to cattle as a fodder.

All are beautiful plants, the graceful Traveller's Joy forming arbours in the chalk-downs, and I have known parts of the Downs in Surrey, as at Boxhill and Reigate, simply covered by such shelters, which

are a veritable paradise for birds. Then the Golden Buttercups which gild the meadows, but do not colour the butter, are enshrined in everyone's heart as part of the splendour of summer and bright days. The Wind Flower is also a lovely plant, sung by the poets.

The little Mousetail lurks in the furrows of the cornfield and has but few stamens, and a curious scape with pinkish flowers. The Marsh Marigold, too, is another favourite, gathered by every child in spring as the May Blob, or, as they call it here in Leicestershire, Water Blob. Columbine and Larkspur are favourites in the garden. Monk's Hood is also found there, too, and has been used for nerve trouble. Once the Hellebore or Christmas Rose, one of our earliest flowering plants, was an antidote for madness, when in former days many quaint remedies were employed.

The general characters by which the members of this interesting order may be recognised are the five petals and five sepals, which are sometimes regular as in the Buttercup, or irregular as in Larkspur and other flowers with a spur, and the numerous stamens which are indefinite, which are inserted upon the receptacle.

There are generally many carpels which either contain one or many seeds, and usually the fruit is an achene, but in Baneberry a berry.

Often the leaves are all radical, arising from the root, as in many Buttercups, Bear's Foot, Pæony, or

they may be alternate and opposite as in Clematis, upon an ascending or creeping stem.

The sepals are variable, however, between three and six, and are frequently like petals as in the Monk's Hood. There may also be more than five petals, as in Pilewort, in which I have frequently found ten or more, or they may be abortive as in Goldielocks, which has one wanting or eaten away. I have found perfect forms of this pretty species, however, with all the petals. It is at the base that the honey is stored in the nectary.

Most of these plants are terrestrial, but the Water Buttercups are submerged or floating, and Marsh Marigold is a marsh plant. A few have only one cotyledon, and in many ways they resemble monocotyledons.

THE WOOD ANEMONE (*Anemone nemorosa*).

There are few counties in Great Britain where this lovely flower does not grow. So common a flower, with so sensitive a nature, exposed to sun or cold is naturally popular, and it has been immortalised in song. And, indeed, a bed of the delicate Wind Flower in a sylvan glade, into which the shafts of golden light are shot but fitfully in spring, as the shadows chase each other across the April sky, is a sight that lingers in the memory.

In its favourite habitat, a wood, this beautiful wild flower is to be found more generally in those shady nooks which are protected above by a plentiful

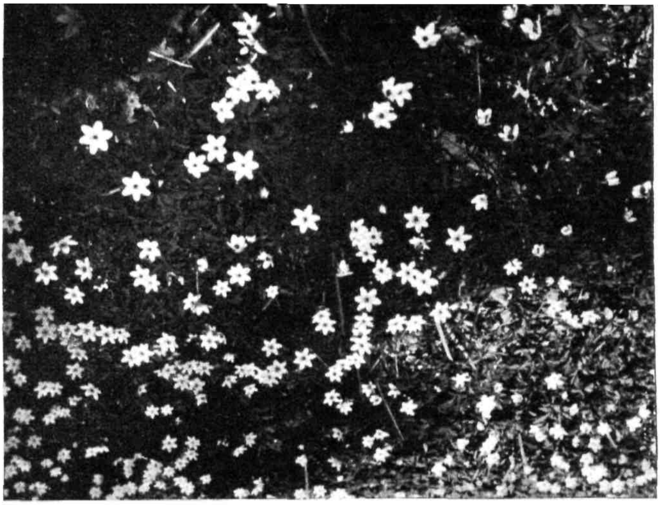
awning of foliage afforded by woodland trees, from the glare of a too hot sun, and where clumps of bushes or shrubs shield it on all hands from the biting blasts of a March or April east wind. As it has wide-spreading rooting tubers it forms extensive patches like a bed of violets. The tubers multiply by division and are usually crowded together, and a number of the pure white blooms spring up close to each other, as pearls in a sea of green.

I have seen a bed of the yellow anemone growing as a wild anemone in an orchard, side by side with the double white one and the single one, but though they are beautiful, as is the blue anemone once found at Wimbledon, and pictured by old Curtis in the eighteenth century in his wonderful 'Flora Londinensis,' yet the single white wild anemone surpasses all in its delicacy and purity of form and colour. And it is the same with the Wild Snowdrop, for the single flowered form is far more beautiful than the well-known double garden form.

Where the Wood Anemone grows there you will find, too, the Golden Lesser Celandine, and the azure blue Bluebell.

The roots of this jewel of the woods are deep reaching (the plant does not become detached from its newer rooted offshoots, but grows bigger each year; they were sold by weight at one time), striking far into the humus soil which is so characteristic of a wood or hedgebank.

As the name Wind-flower suggests, it is a delicate



G. B. Dixon. FIG. 1.—WOOD ANEMONE. *See page* 37.

B. Hanley. FIG. 2.—WATER BUTTERCUP. *See page* 40.

flower. In the daytime the stem bearing the flower and bracts is erect, but droops at night and when the sun is too hot. The flower stalk is long in proportion, and the leaves are divided into three or five lobes. The flower is pure white, with six sepals. Sometimes a pink variety is found, or one inclined to blue.

It is a perennial plant, and is in flower in March and April.

There is no honey in the flower. It is the sepals that make the flower so conspicuous. The stamens are numerous and cover up the stigma on the opening of the flower, both ripening at the same time. When insects visit the flower they settle in the centre, and the anthers are exposed and are first touched. As the flower is drooping the pollen is liable to become attached to the stigma without the agency of the insects which visit it, which consist of bees, flies, and beetles. Bees bite a hole in the bottom of the flower and feed upon the pollen. The seed is scattered by the wind.

In Scotland it is called Darn Grass, because it is supposed to cause a disease termed darn or black water in cattle, and is also said to cause flux. A pretty country name is Bowbells. A corruption of Anemone, or Enemy, is used in some districts for the Windflower. "Doon i' the wild enemies" (Tennyson, "Northern Farmer"). "Drops of snow" is a very expressive name.

Fairies are, of course, associated with so truly woodland a plant, for in wet weather they were sup-

posed to shelter under them. Naturally, too, it was consecrated to Venus.

Water Buttercup.

There are a great number of so-called batrachian Ranunculi or Buttercups, which are found in water growing entirely submerged or floating on the surface. They may be found in almost every pond or river or ditch.

A few of these grow on mud in shallow water and have almost entire leaves with few lobes, such as the Ivy-leaved Water Crowfoot, and there is another, the celery-leaved Water Crowfoot, which grows at the sides of ponds, with erect stems and leaves and a well-developed root-stock.

These are some of the transitional types which unite the water buttercups with the land forms.

In the truly aquatic water buttercups the leaves are of two kinds, the one floating, flat, lobed, shining, divided into wedge-like divisions; the others linear, finely divided, hair-like. These are usually submerged. Doubtless originally they were like the floating leaves, unless the former are derived from the latter. They have become adapted to life in the water, and are thus divided to enable the plant to present a greater area of surface, by sub-division, to the watery element and to the light, in order to obtain an adequate supply of the necessary food-materials.

This streaming habit is, moreover, characteristic

of water plants which are continually being set in motion by the current, and in most the ribbon-growth is well developed.

The flowers stand up above the water, and scattered about amongst the delicately divided leaflets present an exceptionally chaste appearance. Unlike the land buttercups, the water buttercups have white flowers with yellow anthers.

The stems are long, limp, often hollow and succulent, shiny and branched, and spring from roots in the mud, and several rootlets also spring from higher portions of the stem. The leaves, as has been shown, are of two kinds. There are membranous stipules, which are broad and rounded. The peduncles are not so long as the leaves or little longer, and there is a leaf opposite each, one flower being borne on each. The flowers already described are half an inch or more across. The petals are obovate and a yellow gland is situated at their base, the sepals being much shorter. The stamens are numerous and longer than the pistil. The fruit is an achene, which is usually hairy.

The anthers ripen first. Insects settle upon the flowers, as in the Anemone, and help to carry pollen to another plant. The achenes are dispersed by the water.

CREEPING CROWFOOT (*Ranunculus repens*).

The Latin name Ranunculus is a particularly apt term to apply to so damp-loving a plant as the

Creeping Buttercup; indeed, it is not unoften to be found growing actually in water in a ditch where frogs abound, and might be regarded as a further example of a transitional form of buttercup leading on to the Water Buttercups.

A ditch is certainly the best place in which to search for it, and as it grows low down in such places, many will be the nettle stings the beginner will receive before he succeeds in collecting his specimen of this retiring crowfoot.

The name crowfoot, by the way, is given to most buttercups on account of the three-fold division of the leaf, like the expanded toes of a crow.

When not growing in a ditch the Creeping Crowfoot is found on damp banks or in hollows by the wayside, or in fields or woods where moisture abounds. In this respect it differs from the Bulbous Crowfoot, with which it is often confounded. I have often stumped the beginner with the right names of these two plants, as they are not unlike, and unless one carries the distinctions clearly in one's head one may easily consider they apply to the other of the two. In the Bulbous Crowfoot the sepals are reflexed; in this one they are erect or nearly so. In both the peduncle is furrowed, whereas in the Upright Meadow Crowfoot it is not. Moreover, the bulbous crowfoot is provided with a bulbous stem below which is much sought after by rooks in the field. It grows besides in drier places. The Creeping Crowfoot has also a decumbent stem, with runners, and a

C. Mosley. FIG. 3.—CREEPING BUTTERCUP. *See page* 42.

B. Hanley. FIG. 4.—LESSER CELANDINE. *See page* 44.

character not noticed by any writer is the purple colour of the lower sheaths of the leaves, which grow in the shade, which in the bulbous crowfoot are exposed to the light, and are green or yellowish white. The Bulbous Crowfoot has the rosette habit, whilst the Creeping Crowfoot is a trailer.

The Creeping Crowfoot is generally hairy all over. The primary stem, with usually one flower, is generally erect, the lateral ones or stoles creeping. The root is fibrous. The leaves, as in most of this group, are divided into three main lobes, and the leaflets deeply cut and cuneate or toothed, the upper leaflets on the peduncle single or linear or bifid. The calyx is downy. The carpels are glabrous or but slightly hairy, and the glands or nectaries are provided with a scale. The beak of the carpel is long and somewhat curved, with a compressed margin.

The petals are usually erect, and the flowers one inch in diameter.

The Creeping Crowfoot is a perennial, which is in bloom from May until August. It multiplies itself largely by division of the root and by its creeping runners.

The anthers are ripe first, and discharge their pollen towards the outside of the flower, and the stamens turn outwards as they ripen, so that they do not usually self-pollinate the flower. Bees and other insects settling in the centre get dusted with pollen and bear it away to another flower. But the

inner stamens do not ripen till the stigmas are ripe, so that the flower is often self-pollinated. The achenes when ripe fall in a cluster around the plant.

THE LESSER CELANDINE (*Ranunculus Ficaria*).

Few plants are more widely dispersed than the Lesser Celandine or Pilewort. The name Celandine was given to it because there was an old tradition that the swallow cleared the eyesight of its young with this plant, and so it has been called also the Swallow-wort. But this is more or less a misnomer, because it is in bloom before the swallow comes. Possibly that other Celandine, a poppy-like plant which is much larger and for which the generic name is Chelidonium, is the one originally intended, as it flowers later, and the yellow juice yielded, like that of *Papaver Lecoqii*, but stronger, is, in fact, regarded as a remedy for human eye diseases. I have known railway guards, who are frequently also herbalists, plying the latter trade when, as goods guards, they are able to travel about, and in their spare time botanise about the sidings, cuttings, and gardens along a railway, declare it, even in these days, to be a remedy. As a matter of fact it closely resembles in appearance a mercuric ointment recommended by doctors for this purpose, hence perhaps, and because it is very acrid and astringent, the reason for its use.

The second name in Latin, and the frequently used English synonym Pilewort, was applied to

this plant also because it was supposed by doctrine of signatures to be a remedy for piles, because the little tubers so closely resemble them! This is a good example of the crude reasoning of the herbalists of Gerard's day and onwards.

The Lesser Celandine is a very common plant, found in all parts of the British Isles in shady places, and though generally common in lowland districts, occurs on hills at a height of over two thousand feet.

It is very unlike a buttercup, but is truly a member of that group. There are several peculiarities it possesses which rank it near the Monocotyledons. Thus it has but one cotyledon, and the calyx is in three parts, whilst the petals vary from five to ten or even sixteen.

It is largely propagated by the little tubers, and is in some cases stoloniferous, spreading laterally by rooting stems.

It is to be found in damp woods, where there is a good deal of clay on the sides of ditches, and generally under trees, where it grows well. I have seen a copse covered as with a carpet of shining gold in Spring by this lovely little flower. And when the sun is strong, the petals, which are shining, look like burnished gold. They are paler as the flowers get older, and after a time the whole plant becomes very untidy-looking, the leaves turning yellow, until later nothing remains but a bunch of the little tubers, which each furnish the starting-point, like diminutive potatoes, for a fresh plant next year. When it grows

amongst grass it generally ousts the latter, being, during the growing season, a sturdy species.

The plant with its clustered tubers has the rosette habit, with a compact mode of growth.

The leaves are radical and on long stalks, cordate or crenate, shining, with well-marked veins. As remarked, the sepals are three, and the petals variable with a nectary at the base of each. The petioles are somewhat enlarged at the base. The ripe carpels are quite smooth, as indeed is the whole plant, which is glossy and dark-green. It is not more than six inches in height.

The flowers appear in February, and continue right up till April, when the Lesser Celandine is at the height of its glory, lingering on fitfully into May.

Its stellate flowers are enshrined in verse, and it was particularly endeared to Wordsworth.

> "Long as there are violets
> They will have a place in story ;
> There's a flower that shall be mine,
> 'Tis the little Celandine."

When it flowers there are few insects about, but it is visited by flies, bees, and beetles, although the latter do not like yellow flowers, and being conspicuous it is often sought by honey-seeking insects, which get dusted with its abundant pollen, and carry it off to the next flower. So it is frequently cross-pollinated.

When the fruits, which are achenes, are ripe they

break away from the receptacles and are distributed not far from the plant that produces them.

Most of the buttercups are very acrid, but the Lesser Celandine only slightly so, and some have used it as a pot-herb.

It is the tubers that are acrid, but they are eaten by pigeons.

Marsh Marigold (*Caltha palustris*).

Like the last, the Marsh Marigold is general in the British Isles, and as a Northern Arctic plant grows at even greater heights up to over three thousand feet.

As the first English name implies, and the second Latin name, it is found in damp marshy places, being fond of moisture. Indeed, every wet low-lying district has some Marsh Marigolds here and there, and in favourable spots it is very abundant, forming golden patches like the Lesser Celandine, but whilst the latter is a pale yellow, the flower of this lovely species is a deep rich yellow, like the yolk of an egg.

A well-marked character is the cup-like form of the corolla, as implied by the first Latin name, derived from the Greek for goblet or chalice.

Where the Marsh Marigold grows there you will find sedges, willows, horsetails, and the delicate lilac Lady's Smock; in fact, it goes generally with the last in popular fancy and verse.

It forms a compact clump with its erect flowering stems and numerous leaves on long stalks. Gene-

rally it grows in hollows, well-rooted in peaty soil, in which some lime is present.

Generally speaking, it has the habit of the Lesser Celandine, though more erect than the last, but it resembles it in being glossy and smooth all over, the leaves dark-green, the stalks lighter and more yellow in colour. The stem leaves are sessile.

The leaves are orbicular with a crenate margin, growing on long stalks in a dense mass. They are cordate below or reniform. The corolla is golden yellow, the five sepals are yellow, growing as the petals, and are oval. The fruit is a follicle which is spreading with a recurved beak.

In general the Marsh Marigold is a foot to eighteen inches in height. It flowers in March up to May.

There are two pits at the base of the carpels containing honey, with a fold which helps to retain it, in drops. The anthers shed their pollen when the stigma is ready to receive it, and open outwards, the outer ones first, the inner later, so that the flower may be self- or cross-pollinated. Flies, bees and wasps visit it.

The wind assists in scattering the seed from the ripe follicles to a short distance from the plant.

It is called Marigold because it was dedicated in mediæval times to the Virgin Mary.

Several local names are applied to it in different parts, such as Blob, Bull-flower (bull meaning strong, vigorous), Marsh Mallow, May-flower, and Publicans and Sinners, in Oxfordshire.

B. Hanley. FIG. 5.—MARSH MARIGOLD. *See page* 47.

W. Bell. FIG. 6.—YELLOW WATER LILY. *See page* 51.

It has also been called Will (wild) Fire, and Tennyson uses this name—

> "The wild Marsh Marigold shines like fire."

The Marsh Marigold is highly irritant and acrid, or poisonous. But the buds have been used in place of capers, being pickled in the same way.

The petals boiled with alum yield a yellow dye. They have a tradition in Iceland that it serves when carried about as a talisman to prevent an angry word being spoken to a person.

The Water Lily Group.

The Water lilies are aquatic plants, and veritable nymphs of the pool, as the Latin name for the Order, Nymphæaceæ, suggests.

They grace every pool of any size, or river, with their floating tray-like leaves, fragrant white and yellow flowers, borne on the long rope-like stems which are embedded down below in the mud at the bottom of the dark pool whose face mirrors the floating flowers before us.

These plants are all herbaceous. Two foreign plants are included in this order, one the Lotus lily, which is held sacred in the East, because it gave birth to Brahma, and was said to have been the cradle of Buddha.

It figures largely in art as a symbolic emblem. I have seen it represented upon the quaint vases of

Lowesby ware, which was made about 1834 in Leicestershire, and painted in London with representations of the Lotus and exotic butterflies. The Egyptians made bread of the roots and seeds of their Lotus. The *Victoria regia* is another wonderful member of this group, with leaves six and a half feet in diameter, with an upturned rim like a tray, and splendid blooms fifteen inches across.

The seeds of the *Victoria regia*, called Water Maize, are eaten in South America, where it is found.

Many of the roots of members of this group yield, like the Arum lily, a sort of starch. The Water Bean, which is the origin of the fabled Lotus, is perhaps the Egyptian Bean of Pythagoras, and figures on many ancient monuments. The cornucopia or horn-like instruments of the ancients were supposed to be an imitation of the peculiar seed-vessels.

According to Linnæus the flowers of the White Water Lily open at dawn and close at evening.

The Water Lily group is characterised by the floating habit, peltate, cordate leaves, four to six sepals, which merge into the petals, which are numerous, and the latter can with difficulty be distinguished from the stamens, both of which grow upon a fleshy disc which surrounds the ovary (flask-like in shape) completely. The stigma, which is sessile, is rayed and peltate. The berry contains many seeds in its many-celled interior, each having a gelatinous aril.

The flowers are yellow or white and single upon a scape.

There are about forty species of Water Lilies and allied plants.

THE YELLOW WATER LILY (*Nymphæa lutea*).

Though the Yellow Water Lily is so common a plant in some parts of the country, it is not found, for instance, in East Cornwall, North Devon, the Isle of Wight or the Isle of Man, some parts of Wales and Scotland. But although this is probably due to its being a lowland plant, not found in mountainous districts, yet it grows at an altitude of a thousand feet in Yorkshire.

The water lilies are unique examples of aquatic plants with their large floating leaves, and are favourites of the poet, as for instance Shelley, and popular with everyone.

Scarcely a pool, pond, or slow-flowing stream or river is without its Water Lilies, especially the one we are describing, which is much commoner than the equally beautiful white Water Lily.

The name Water Lily is quite popular, and the plant has no real resemblance to a Lily. The first Latin name refers to its favourite habitat, water, describing it as a nymph of the pool.

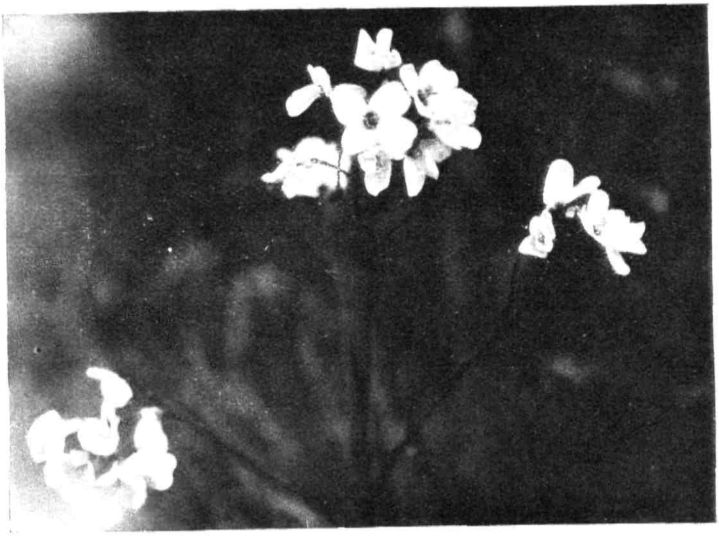
Like true aquatic plants it grows entirely in the water with the leaves afloat, the long streaming stems submerged and deeply rooted in the mud. Only the flower projects above the surface.

The poet of human nature here has in mind the damask-like effect of a meadow dotted with its countless blooms as a pure white sheet, hence one rendering of the name Ladies' Smock. In the alternative spelling Ladysmock it may be that it was, like many flowers in mediæval times, dedicated to Our Lady, the Virgin Mary. It is also called cuckoo-flower because it is in flower when the cuckoo comes, but many other flowers are so-called, and there is uncertainty as to which is really meant, an argument for the binomial Latin nomenclature invented by Linnæus, adapted from the older Latin descriptions of a few Latin sentences.

When called Bitter Cress it is applied to the pungent nature of this and other species, as well as Water Cress, and the Lady's Smock was used as a salad, and as a remedy in certain complaints such as epilepsy.

The first Latin name suggests its supposed power of soothing the heart, in convulsions, etc. The second Latin name indicates its principal habitat—a meadow. Wet, low-lying meadows are its principal haunts, but it may also be found on the roadside, and I have noticed that it is frequent in well-shaded churchyards, or even occasionally in a wood.

In a meadow it is usually abundant, growing all over a flat marshy tract, dotting it like the Golden Buttercup with its equally lovely lilac or white flowers. A clump growing by a stream-side has an extremely beautiful effect.



B. Hanley. FIG. 7.—CUCKOO FLOWER (flower enlarged). *See page* 56.

B. Hanley. FIG. 8.—SHEPHERD'S PURSE. *See page* 58.

Though the lowlands abound with Lady's Smock, it is also found in hilly districts on the sides of the slopes where springs issue forth and cause a morass to form.

The plant has an erect habit, the single stem being rigid, straight and rounded or angular.

The root-leaves are orbicular, the terminal one larger, and grow hidden amongst the grass, in a loose rosette fashion. The stem-leaves are pinnate, with linear-lanceolate leaflets, entire, with no stipules. The stem may have a purple tinge like many other semi-aquatic or marsh plants.

The calyx is membranous at the edge. The petals, four, as in all Crucifers, are large and spreading, the anthers yellow. The pods on short stalks are erect, an inch or more long, with a capitate stigma.

Lady's Smock grows to a height of nine inches or a foot, and I have found it even more, or fifteen inches in height. The flower is in bloom from April to June, and at its best in May.

Two large honey glands occur at the bottom of the corolla below the two short stamens, and there are two smaller ones in place of the abortive stamens. The sepals are persistent and so retain the honey. The anthers open towards the centre in bud, but before the stigma is ripe the four inner stamens grow longer and turn outwards. Pollen is deposited upon the bee's body from the taller stamens. If insects do not visit the flower, and in wet weather, the pollen, however, from these four falls on the stigma, and the

The stamens being on a level with the stigma and the flower small and inconspicuous it is liable to be self-pollinated. Flies are the chief visitors perhaps for this reason.

The pods open when ripe and disperse the seed around the plant.

Shepherd's Purse goes by a number of names: Bad Man's, Blind Weed, Case Weed, Lady's Purse, Mother's Heart, Naughty Man's Plaything, Pepper and Salt, Pick Pocket, Sanguinary.

The name Pick Purse is given because it implied poor land.

The Violet Group.

The Violaceæ are a very natural group like the Crucifers. They are small herbaceous plants rarely growing to the height of a shrub or assuming that habit, except in the case of some foreign species.

They bear extremely beautiful flowers and are generally popular. Many varieties are grown in the hothouse for early forcing, and improved forms are produced.

The Pansy, which is a Viola, is also a well-known and deservedly favourite member of the long border. The varieties, under cultivation, are endless. And I have myself noticed the extreme variations that occur between the wild pansy and the garden flower, when the latter has run wild and gone back to its original character.

Violets inhabit a number of different habitats.

There are the woodland and wayside Violets, which love the shade. There are, again, those that can exist alone upon the open down in the full glare of the sun. A minority are fond of boggy places, where some peat is to be found. Including the Pansies there are ten wild violets, without counting the numerous varieties, depending upon colour, etc. Generally the flower is blue in the Violet, white or yellow and blue in the Pansy.

They are found in most countries except tropical Asia. Ipecacuanha is a favourite remedy derived from the Violet, and it was considered good for lung and cough troubles. They are also used as emetic and laxative remedies.

There are nearly two hundred and fifty species and over twenty genera.

The root or rhizome may be short, and a sobole may be present or absent. The stem is creeping in some, such as the bog Violet. The leaves are ovate or cordate on long furrowed petioles, hairy or glabrous, usually with a crenate margin, and the stipules in Heartsease are pinnatifid. The calyx is made up of five sepals which overlap, with five petals which are unequal, and produced into a spur (the lowest and largest), there being two lateral ones and two above. The lateral petals are bearded and entire, while the spur is directed downwards like the lateral petals, whilst in the Pansy only the lowest petal is directed downwards, and the stigma besides is capitate. In the Violet there are five stamens which alter-

nate with the petals and are sessile, and the anthers form a ring round the ovary, and are prolonged into a slight membrane and connate. The ovary is one-celled and sessile, with an ascending style, swollen at the base with a slender hooked stigma. The seeds are in three rows in a three-valved capsule and numerous.

THE SWEET VIOLET (*Viola odorata*).

According to the ancients Io was the cow into which one of Jupiter's lovers was changed, and her food was Violets, which the earth brought forth. Pliny, at any rate, uses this name for the plants included in the genus by Linnæus. The second Latin name, meaning fragrant or sweet, refers to one of its characteristics—its sweet perfume.

On this account, and because of the beautiful blue colour of the flowers, the Violet is a great favourite, redolent of Spring and the woods. Many varieties are grown for the garden, and perfume is obtained from this species.

The Sweet Violet is found in most of our counties, except in some parts of Wales, Lancashire (Mid), and Scotland. In many places it is doubtless, however, planted, but may be regarded as wild in South and East England. It used, in fact, to be cultivated at Stratford-on-Avon. A syrup was made from it, and used by chemists to detect an acid or alkali. It is found generally throughout Europe. In Greece it was used by girls to colour the eyelids blue, and a preparation of it was used for the eyes. Besides this

B. Hanley. FIG. 9.—SWEET VIOLET. *See page* 62

B. Hanley. FIG. 10.—GREATER STITCHWORT. *See page* 67.

it has been employed as a laxative. It is said to render the eyes lustrous and to enlarge the pupil. Other old remedies were based on its diuretic properties. It was supposed to cure gravel or stone.

Woods are the special habitat of the Sweet Violet, where it grows in wide patches, and another favourite haunt is a hedge bank, under bushes.

It is also found on roadsides and in fields where the grass is long upon a sunny bank. It is commonly accompanied by the Lesser Celandine.

Probably its habit of growing in associated patches is due to the fact that the rootstock produces stoles or runners, which root again at intervals, arising from the axils of the terminal rosettes. These stoles are long, and reach far beyond the original stock. The Sweet Violet is thus a prostrate trailer.

The leaves are cordate, with a crenate margin, smooth above and glossy, with hairs below, and when young the margin is revolute. There are ovate lanceolate stipules or bracts above the middle of the peduncle. They are membraneous, with glandular teeth. The petioles are smooth.

The flowers are blue or white, the lateral petals downy near the base. The anther spurs are lanceolate. The style is hooked. There are five filaments. The stigma is oblique and very little longer than the anthers. The capsule is globular, purple, downy, with three round hollow valves. The seeds are numerous and shining, with a short appendage. The fruit stalk hangs down in fruit.

The Sweet Violet is never more than six inches in height. Flowers may be found in March up till May.

The pistil is situated some distance from the lower petal, and is pushed up by an insect, which inserts its head below the stigma. A visitor parts the ring of anthers, and covers its proboscis with pollen. The honey is protected from the rain by the pendulous position of the flowers. The pollen lies between the pistil and free ends of the stamens, being loose and dry. The style, being slenderer at the base, is easily bent by the insect in its effort to reach the honey. It is visited by bees, flies, the Tortoise-shell Butterfly, and the Brimstone.

There are two kinds of flowers—one large, one small—the former much visited by insects, whilst in the other the corolla is rudimentary. The flowers in this case are cleistogamic, and are self-fertilised. The latter are autumnal, and look more like buds, hanging down upon the ground. When ripe the capsule, by tension of the valves, bursts and scatters the seeds.

Laertes wishes Violets may spring from Ophelia's grave:

> "Lay her in the earth,
> And from her fair and unpolluted flesh
> May Violets spring."

There was a superstition that if you dreamt of violets you would receive some advancement in life.

The Grecian garlands were made up with violets, as were bridal wreaths.

There are several common names for the violet, such as Appel-leaf, Bair Wort, Banwort, Blaver, Bessy Banwood, Fine Leaf, Vilip.

THE PINK GROUP.

Many striking and beautiful wild flowers are included in the order Caryophyllaceæ. Thus it comprises such plants as the Clove, Pink and Carnation, Soapwort, Bladder Campion, and other Campions, Catchfly, Lychnis, Corn Cockle, Pearlwort, Sandworts, Stitchworts, Chickweeds, Spurrey.

They all have an erect grass-like habit, in most cases, *e.g.* the Stitchworts, with long linear leaves; others have a rosette habit as the Pearlwort, or a cushion habit as the Pink and Carnation. Many have the stem thickened below and woody, but all are herbaceous.

They possess no properties of any importance. The Pink, Carnation and Clove are of course favourite garden flowers, and an oil is expressed from the Clove.

The Sweet William is another delightful old-fashioned flower to be found in those gardens where modern geometric bedding is eschewed. It has bracts as long as the sepals which protect the flower.

Some of the members of this group have the

calyx connected at the base into a tube, as Pink, Soapwort, Catchfly, Lychnis, constituting the Pink tribe, whilst in the Chickweeds this is not so, the sepals being distinct, and whereas in the former the capsule is stalked, in the Chickweed group it is sessile.

In many of these plants the stem and leaves are glaucous. Usually the stem, which may be leafy or a scape, is erect, but may be decumbent at the base, and give rise to a number of lateral branchlets. A frequent character is the swollen nature of the joints. The leaves are flat, ovate, lanceolate, glabrous or downy, as in Lychnis, and are entire, opposite, simple. The stipules are absent, or are small.

There are four to five sepals, which, as shown, are distinct or united into a tube, and in bud are imbricate. The petals are similar in number, four to five, and may be inserted below the ovary or borne on the calyx, and not attached to the ovary. Sometimes there are ten stamens—a distinctive feature—or eight if there are four petals inserted with them, sometimes the same number only, and the filaments are filiform. There is one ovary, which is pedicellate or inserted in a ring. The fruit is a capsule with numerous seeds, and one- or imperfectly two- to five-celled; and there are two to five stigmas, the capsule opening by twice as many teeth as there are stigmas, which may be valvular.

The Chickweeds may be used as a salad. Soapwort has a root which contains a soft, gummy,

resinous matter used for lathering like soap. Chickweed and Corn Cockle are used as birdseed. The latter used to grace our cornfields, but it is now rare. It used to blunt the sickles in the days of reaping.

THE GREATER STITCHWORT (*Stellaria Holostea*).

The first Latin name refers to the well-marked arrangement of the petals of the flower, which in the Grassy Stitchwort, more so than in this plant, are star-like or stellate. The second Latin name means all bone, and was said to be applied to it by a sort of euphemy, because instead of being rigid and strong the stem is remarkably brittle and needs the support of surrounding plants amongst which it grows. Probably the swollen nodes like knee-joints and the brittleness are the real reasons why this name was given.

The term "Stitchwort" is also obscure. It may be that it was regarded as a remedy for the stitch in the days when all plants had some curative virtue.

Greater Stitchwort is found in every county except Mid-Lancashire and some Scotch counties, and in the Highlands grows at an altitude of 2000 ft.

This lovely spring flower is to be found in woodlands, where it grows amid the undergrowth which protects and supports it. It is also found in the hedgerow peeping out between a medley of other wayside flowers, and adding grace to every leafy lane. Thick extensive woods it eschews, but is common in

long narrow plantations which are sparsely wooded, and where there is a good deal of sunlight.

The flowers of this pretty species are larger than most of the others, and this and the characteristic foliage and brittle stem distinguish it.

It has the grass habit like most of the Stitchworts. The stem is tall and erect, branched above, very slender and tumid at the joints, quadrangular, and like many other Stitchworts geniculate at the base, or bent before it becomes erect.

The leaves are lanceolate acute, with a carina beneath, and with a row of stiff hairs along the margin, stalkless or sessile. The upper leaves are sub-erect with the margin revolute, the lower not so long and bent back.

The large, white satiny flowers have bifid petals. The anthers, yellow at first, turn reddish-brown. The sepals are half as long as the petals. The flowers are grouped in a panicle, and borne on long slender pedicels. The globose capsule contains but few large, orange, notched seeds.

This graceful Stitchwort is often two feet in height. The flowers may be met with in April up to June. But I have seen it in flower at Blindley Heath in Surrey in an early season in mid March, with Willow Herbs and the barren Strawberry.

The nectaries are yellow and situated outside the outer row of stamens, which are ten in number and not so long as the corolla.

They have a honey pit above and contain much

B. Hanley. Fig. 11.—Greater Stitchwort (flower enlarged). See page 67.

C. Mosley. Fig 12.—Flowers of the Lime. See page 71.

honey. The outer stamens at first, then the inner are close to the centre and turn their surfaces upwards, whilst the other five are bent down. The stigmas in the first stage are bent inwards; in the second they are erect, with their papillar surfaces turned towards each other. In the third phase they become expanded and the anthers are then withered. By the spreading of the stigmas, which may touch the inner stamens, the flower is self-pollinated. But it is visited by a variety of insects, flies, bees, beetles and butterflies.

When the capsule with its six valves is ripe the latter split open and the seeds are dispersed at no great distance from the plants that produced them.

There are some interesting vernacular names for this wayside favourite, such as Adder's Spit, Allbone, Easter Bell, Billy White's Buttons, Bird's Eye, Brandy Snaps, Breakbones, Dead Men's Bones, Headache, Milkcans, Moonflower, Pick-pocket, Pyxie, Shirt Buttons, Snapwort, Thunder-flower.

The reason for the name Thunder-flower is said to be because the unripe capsule contains air, and when pressed goes off with a bang. Naturally this is a game children delight to play.

Fairies held it in special favour, so they say, and for fear of being "pixy-led" the poor people were afraid to pluck it.

In the daytime and in sunlight the Yellow Underwing may be seen hovering over the flowers.

The Lime or Linden Group.

Most of the members of the order Tiliaceæ are trees or shrubs. Some are herbaceous. They are closely related to the Mallows.

They yield a mucilaginous juice, and the wood is used for a variety of purposes. Being white and light it is used commonly in turnery for ornaments and legs or arms of chairs, etc., and in carvings. In *Sparmannia*, a Cape of Good Hope plant, which has white flowers, the stamens if touched will move backwards. An Egyptian plant, *Corchorus*, serves as a pot-herb, and in an allied Indian species, or Jute, fishing-lines, nets, and bags are made from the fibre.

Most of the plants have broad, ovate leaves, which are oblique, acuminate, toothed, downy below or in the axils of the veins, or smooth. The leaves are normally alternate, distichous, or in two rows, with stipules which fall soon after they mature. The flowers are in axillary corymbs with few flowers borne upon a peduncle, and below produced into a white membrane-like bract—a very characteristic feature.

The plants are largely members of the Tropics, and there are over 300 species.

The Common Lime is widely distributed throughout Europe. In England it is doubtfully native, the small-leaved lime being the more probably indigenous one. It does not grow usually at any high altitudes or much above 300 ft. above sea-level. But in

England it is generally planted in parks and similar places. Its delicious scent is one of its marked features. It was said to yield the finest honey, but probably bees that feed on White Clover produce the best.

The buds are velvety, and the leaves when fully grown are slightly downy below. The calyx consists of five lanceolate sepals, which are valvate in bud and distinct below, falling eventually.

The petals are of the same number, with a pit at the base, and are longer. The stamens are inserted below the ovary, and numerous, free or somewhat united below. The ovary is five-celled. The style is simple, and the stigma is made up of five lobes above. The fruit is coriaceous, indehiscent, containing one or two seeds usually, some being abortive. The seeds enclose a fleshy albumen and an embryo.

The bast is very strong, and used by gardeners. The flowers afford a volatile oil, and sugar, mucilage, tannin, and gum.

The Lime or Linden (*Tilia vulgaris*).

The English name is of ancient origin, but was doubtless first applied to the small-leaved lime, which is a native of this country. This species, though generally scattered up and down the country, and native in Europe, is an importation in this country, and always planted originally, though self-sown trees may be found in many places.

The Lime grows in plantations, in parks, gardens, churchyards, and along the roadside and in hedges in fields, and is often used for avenues. It is commonly planted also in towns and villages.

The trunk is tall and erect, with a thick bole, buttressed, and gives off many hairy suckers of quick growth at the base, having usually many swollen knots where they have been cut away. The leaves are large, cordate, glabrous, glossy above, hairy only in the axils of the veins beneath, which are prominent, and unequal at the base.

The flowers arranged in a naked cyme are yellow, several flowers being borne upon the peduncles, and attached to the cyme is a large leaf-like bract, which serves as an aeroplane later to disperse the seeds, which are contained in a downy unribbed capsule, woody and smooth.

The Lime grows to a height of 50 ft.

It is a deciduous tree, coming into leaf in April, and shedding its leaves, which turn a saffron yellow, in September.

The flowers appear in June and may be found right up till August.

A well-marked character of the Lime is the sweet fragrance of the flowers, which are much visited in consequence. The honey is abundant and contained within the sepals so that insects of the short-lipped type can easily reach it. Rain does not damage the honey, as the flowers droop and are further protected by the large bract. The numerous stamens ripen

before the stigma and prevent the flower from being self-pollinated, being also longer than the petals, curving outwards. Insects settle on them or upon the stigma or between them and so carry pollen from one tree to another. Bees and flies are the chief visitors.

It is said that the seed does not often ripen in this country, but this has been said of the Common Elm and is not strictly correct.

The parachute or aeroplane-like bract carries the seed away upon the breeze to a considerable distance from the tree, whose branches, at first bent upwards, then outwards, finally bend down and afford wide and rainproof shelter beneath their umbrageous canopy.

Though Pliny gave the name "Tilia," there are some old vernacular names that might equally have given origin to it, such as Teile, Til, Tile, Tilet Tree, Tillet, Tillet-tree. It is also called Lenten, Lime-tree, Lin, Linde, Line, White Wood.

Superstitious folk used to venerate the lime and carry their children to those in which there were holes to drag them through. The bark of the lime was used to tie garlands up with in the old days of banquetting.

The last name cited above gives a clue to its character. And it is owing to this that it is so much used in joinery. Formerly light bowls, dishes, boxes, were turned from lime wood. Baskets and cradles are made from the twigs. Writing tablets were made from the bark.

ribbed, with valvate tips, and imbricate. The peduncles are longer than the leaves. The petals, which have a claw, are five also, and in the bud slightly twisted. The stamens are two or three times the number of the petals united with filaments.

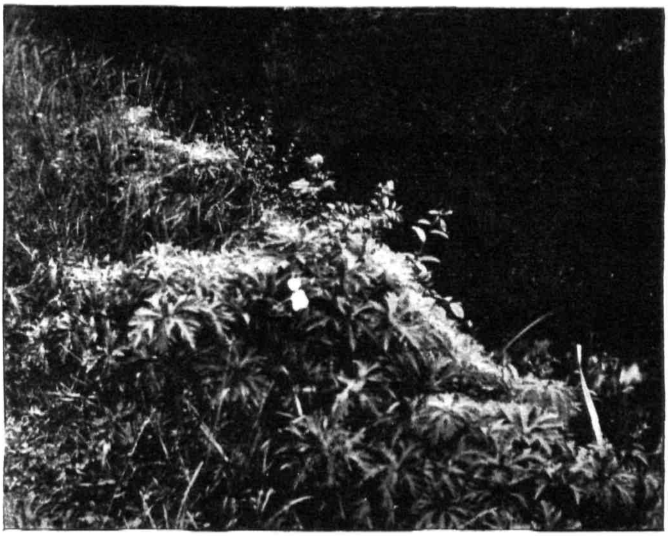
The carpels are five or variable around the awn-like beak, to which the five styles are united, and there are five stigmas, with five capsules containing one seed each ; the fruit being a schizocarp, the carpel splits off from the beak with the persistent style attached, which, curling up, being hygroscopic, assists in hurling the seed to a distance by a balistic or catapult motion.

In the Stork's Bill the leaves are pinnate, the plant decumbent as a rule, and five of the stamens are abortive, being small with flattened filaments, without anthers, and opposite the petals in the outer whorl.

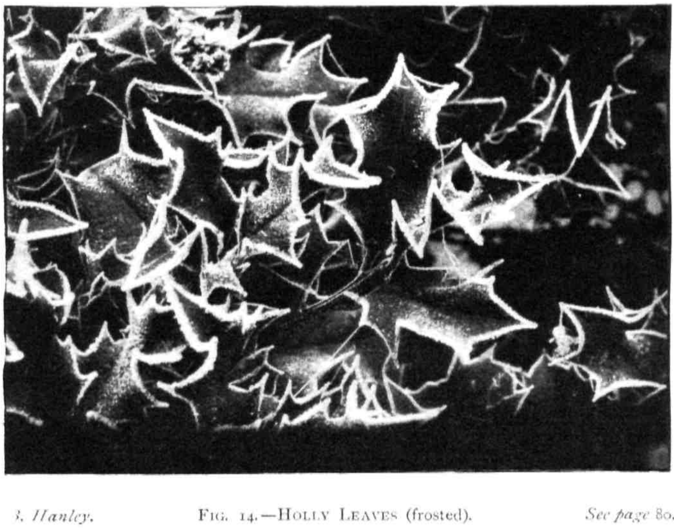
In Pelargonium the flowers are irregular and possess a spur formed from the posterior sepal of the calyx, which is straight and adhering to the peduncle. In the corolla there are usually three petals which differ from the two upper larger ones. Only three of the outer stamens are abortive.

THE MEADOW CRANE'S BILL (*Geranium pratense*).

Few wild plants are so attractive as the Meadow Crane's Bill, which is worthy of a place in the garden without any embellishment by long cultivation, such as many of our garden favourites have required before



A. R. Horwood. FIG. 13.—MEADOW CRANE'S BILL. *See page* 76.



. Hanley. FIG. 14.—HOLLY LEAVES (frosted). *See page* 80.

attaining their present state of perfection. Thus Nature has here displayed her own inimitable power of surpassing man's art, achieved as it must necessarily be by artificial methods which are foreign to her unwritten laws.

The Meadow Crane's Bill is found in nearly every county except in some of the south-eastern and Welsh counties and in Scotland. It also ascends to an altitude of 1800 ft.

As the second Latin and first English names imply, this Geranium is at home in the meadow and pasture. It is perhaps more usually found in wet meadows, especially in lowland districts along the side of a stream or river, or in ditches and similar moist habitats. Where similar conditions exist at higher altitudes it is also found.

With it grow usually Meadow Sweet, several Willow herbs, Cowslip, Yellow Rattle, Self Heal, Bugle, Spotted Orchis and other plants.

The root is fibrous, with a thick rhizome. Meadow Crane's Bill is tall and erect with the inversely pyramidal habit of the Geranium. The foliage is abundant with large leaves on long petioles, much divided, the upper ones sessile, borne upon terete, downy stems, which are branched above and tinged with red.

The deep blue flowers are corymbose, with stamens triangular below, smooth and tapering. The capsules are clothed with spreading hairs, glandular, with netted seeds. The fruit-stalks are deflexed.

Three to four feet is a common height for this plant. The flowers are in bloom between June and September.

The anthers ripen first, the stamens opening and shedding pollen and withering before the stigma is receptive. Only cross-pollination can thus be brought about, and that by the agency of insects. To guide them to the honey-glands dark lines in the petals leading to the centre serve as guides to the five glands at the base of the outer stamens, hairs at the base of the petals protecting the honey from the rain. Short-lipped insects can reach it.

The five outer stamens, then the five inner, then the stigma mature in turn. Bees, flies visit it.

The same beak-like style common to the Geranium group enables the seeds to be hurled to a distance when ripe by a catapult motion.

The seeds are dispersed by the curling up of the style, as amongst other schizocarps.

Meadow Crane's Bill is called also Grace of God and Crowfoot, the foliage of the last resembling the leaves of the Meadow Crane's Bill.

The Holly Group.

The name Aquifoliaceæ affords an indication of one of the characteristics of this group of trees or shrubs, namely the spinose or thorny character of the leaves, which are usually armed with sharp-pointed spines. Amongst the cultivated forms are all kinds of variations of leaf-forms. In some, as in

the upper portions of the wild holly, there are no spines at all. In others, such as the hedgehog variety, they are exceptionally developed, and the leaves are twisted into a convolute mass with spines as numerous as those on the hedgehog. Many varieties, too, are variegated, white or golden, and some have narrow leaves, whilst others bear golden, not red berries.

It has always been assumed that in the wild holly the lower leaves bear spines as in many other plants to serve as a protection against cattle and other browsing animals which are fond of gnawing the bark of trees and nibbling the foliage. Certainly the upper leaves are out of reach, and at the same time usually spineless.

Most of the hollies are American plants, the common holly being the only European species. They have astringent properties, and one species, *Ilex paraguayensis*, which yields Paraguay tea, found in the West Indies and South America, yields the malt commonly drunk as a beverage in the New World.

Other plants are used in the same way as tea in North America. The berries are poisonous. One use to which the twigs are put in this country is to make bird-lime. Holly itself is in great request as a decoration at Christmas, and the wood is used in inlay work, being close grained, and for walking-sticks. The berries serve as a medicinal emetic.

The leaves are glossy and coriaceous or leathery, armed with spines, simple and alternate, evergreen.

The Holly has small flowers, and is usually self-pollinated, the stigmas being short and sessile, and the awl-shaped filaments overtop them. Holly is diœcious, with large sterile stamens in the female flower.

The berries are eaten by birds and distributed at a distance from the parent tree.

Pliny applied the name Ilex from the resemblance to the Holm Oak, and Holly is from Ulex, furze, holegn in the Anglo-Saxon.

Several other names are given to this tree in different parts of the country, such as Aunt Mary's Tree, Christmas, Crocodile, Tree Holly, He Holly, Helver, Hot Loud, She Holly, Holm, Hull, Hulver, Poison Berry, Prick Hollin, Sparked Holm.

The spinose or spineless forms were named He and She Holly respectively.

In Northumberland holly leaves were used for divining. It was planted near houses to ward off lightning as early as the days of Pliny. Because it resembles the word "holy" it was reputed to be inimical to witches.

Holly wreathes were employed in Roman times at weddings. People used to cure their chilblains by threshing them with holly leaves. The bark has been used in place of cinchona, being highly astringent. The Tunbridge Ware was made from holly wood, the wood being hard and white, suitable for inlay work.

B. Hanley. FIG. 15.—HOLLY (in fruit). *See page* 80

T. R. Goddard. FIG. 16.—BROOM. *See page* 87.

CHAPTER II

CALYCIFLORÆ

THE families included in this subclass or subdivision consist of plants whose flowers are provided with a calyx and corolla, and the stamens are inserted on the calyx or disc, being either perigynous or epigynous, the ovary being superior or inferior respectively.

The petals are distinct. The flowers are regular except in Leguminosæ, where they are papilionaceous.

The flowers in Halorageæ are generally apetalous and unisexual, as they are in Cucurbitaceæ.

In Parnassia amongst the Saxifrageæ the stamens are hypogynous, as they are in Droseraceæ. In some of the Crassulaceæ the stamens are epipetalous. In a few of the Leguminosæ the stamens are also hypogynous.

The group includes fifteen British families, of which four are described here, viz. Leguminosæ, Rosaceæ, Umbelliferæ, and Hederaceæ, and fourteen species.

THE PEA AND VETCH GROUP.

A well-marked characteristic of the order Leguminosæ, as the name implies, is the legume or pod-like nature of the seed-vessel.

It is a large order comprising four thousand species and four hundred and forty genera, found in all parts of the world, being in fact the second largest order of plants. It is divided into three sub-orders, Papilionaceæ, to which all the British species belong, having a papilionaceous corolla, imbricate in the bud, the odd petal being posterior, Cæsalpineæ, having the odd petal anterior, and also imbricate in the bud, and Mimoseæ, with a valvate corolla. The Papilionaceæ are mainly found in temperate regions, whilst the others are largely tropical.

The British plants included in this order are Gorse, Dyer's Greenweed, Broom, Rest Harrow, Lupin, Medick, Melilot, Clovers, Fenugreek, Bird's Foot Trefoil, Lady's Fingers, Oxytropis, Milk Vetch, Vetches, Vetchlings, Bird's Foot, Horseshoe Vetch, Sainfoin, and of several of these there are a number of different species.

They exhibit great variety in form and colour of flowers, etc. Some are shrubs, most are climbers or trailers, or dwarf, bushy plants, and mainly herbaceous.

A few such as the Locust Tree attain to the tree size and habit, but these are foreign. It is said that

they are to be found in all parts of the world except two islands, including St. Helena.

In this group are included, next to the Crucifers and Grasses, more useful plants than any other group in the whole botanical world. Thus, the pulse which is so common a food in some parts of the world is derived from plants of this order. So are the various cultivated forms of Pea, Bean, Lentil, etc. Fodder is afforded by Lucerne, Clover, Tare, Sainfoin, etc., and Gorse is utilised in the young juicy state in the same way, and from Broom a tea with medicinal properties used to be brewed and the seeds used for coffee. This and Dyer's Greenweed yielded a dye also formerly, as indigo is produced by a foreign plant.

Many of the foreign Leguminosæ also afford woods, such as Logwood, Acacia, and Rosewood. Such products as Gum Arabic, Balsam (Tolu), Liquorice, Catechu, Tamarind are yielded by other exotic species.

Perfumes are furnished by the Tonka Bean and Peruvian Balsam, whilst Melilot has a smell like new mown hay, and most of the British plants, of which more than seventy are known, are fragrant, *e.g.* Clover.

It must not be forgotten also that the Sweet Pea and the Everlasting Pea, which are such favourites in the garden, are also members of this wide and interesting group.

A peculiarity of this order which makes them of such value as food-yielding plants is the fact that the

roots are possessed of tubercles. These are really lateral buds transformed into tubercles, which are the home of certain bacteria that possess the power of storing up nitrogen, derived from the atmosphere. In some way the plant derives not only nourishing substances from the bacteria, but actually when they have absorbed a sufficient amount of nitrogen in the root-cells, absorbs these organisms also into its rapidly built-up tissue. Besides being so rich in nitrogenous matter leguminous plants also enrich poor ground, and serve as a forerunner for such exhausting crops as wheat. When used also as manure they have the same energising effect.

In most cases the stem of the plant is erect and leafy, though many of these, *e.g.* Vetches, are climbing plants, climbing by the leaf tendrils. In the Gorse there are needle-like spines or modified leaves.

The leaves are alternate, with stipules below, compound, often pinnate. At night the leaves may go to sleep and close up as in Clover. The Sensitive Plant or Mimosa is a classic example.

The flowers are in racemes, panicles or spikes, and are regular and polygamous, or irregular and hermaphrodite. The receptacle is convex or flat and the flower is perigynous. The calyx develops in ascending order, and is made up of five sepals, the odd or oldest being anterior, and united. The corolla is made up of five petals, a standard, two alæ, and a carina made up of two conjoined. The stamens are ten, united or free; when forming a tube one (the tenth) is free.

The fruit is a legume or pod which opens along the sutures. In the "Bird's Foot" the pod is constricted between the seeds and then breaks up into one-seeded portions. The pod in Ulex explodes, the valves twisting back spirally expelling the seeds to a distance. In some the pods are winged; animals devour others; some seeds have a fleshy aril, and in Mimosa and Medicago the pods are hooked and spirally coiled in the latter.

The seeds are well provided with material with which to start life.

The Broom (*Cytisus scoparius*).

This handsome shrub or bush is found in every English county and in Wales, except in Cardigan and Flint. In the Highlands it is found at a height of 1000 feet.

As a rule Broom is found upon heathy land, being at home on a barren, sandy or gravelly soil, growing naturally in the same situations as Furze. But, like the latter, it is often planted. Many modern plantations are rendered the more ornamental by a sprinkling of Broom amongst Blackthorn and other scrub or bush plants. It is frequently to be seen covering the embankments of a railway.

Broom is a spreading bushy shrub, with a habit of its own, being a typical switch plant with long filiform branches.

It is tall and graceful, with numerous erect,

being absent in Great Britain from only a few Welsh and Scotch counties, and is rare in Ireland.

This tall, graceful plant is found in most waste places, and along the sides of roads and canals, where it is frequently well established. Usually it is found in such situations that it cannot be regarded as a truly native British plant. With it are frequently found such plants as Poppies, Fumitories, Pepperworts, Charlock, Wormseed, and other leguminous plants, such as Lucerne, Sainfoin, Medick, and other plants common to farmyards, stackyards, cultivated ground, etc.

The stem is tall, woody at the base, slender, much branched, and erect, wiry, and glabrous. The leaflets are ovate, oblong, toothed, serrate. The stipules are undivided, subulate, lanceolate.

The yellow flowers are in secund, unilateral racemes. The petals are equal, the keels winged. The downy pods are acute, black when ripe, and contain few seeds, which are rugose.

Melilot is found to grow in some cases to a height of four or five feet. The flowers are in bloom from June till August.

The flower resembles that of Dutch Clover, but the calyx is not so long, and wider, so that short-lipped insects can get at the honey. The petals also can be stretched apart more easily. The alæ and carina are rotate, the claws not adherent. They return to their former position when the pressure is removed by aid of two digitate processes. The column of

T. R. Goddard. FIG. 17.—MELILOT. *See page* 89.

J. H. Crabtree. FIG. 18.—RED CLOVER. *See page* 91.

stamens is clasped by the insect above, and when the carinæ are depressed they separate slightly, but are placed close to the column, and spring back and grasp it. Bees in general are the chief visitors.

The pedicel rots, and the seeds, which do not fall separately, are dispersed close to the plant, which is an annual.

Hart's, King's, or Plaister Grass, Whittle Grass, Heart Wort, King's Crown, Laburnum, are names given to Melilot in different places.

Garlands and chaplets of Melilot were worn in ancient Greece. There is a quaint legend that the Melilot sprang from the blood of a lion slain by the Emperor Hadrian.

Formerly Melilot was much cultivated in order to obtain the perfume for which it is noted. Gruyere cheese owes its flavour to Melilot. The flowers and seeds are bruised and mixed with the curd before being pressed.

THE RED CLOVER (*Trifolium pratense*).

Common as it is, I think the Red Clover is one of the most beautiful meadow-plants, especially when, as is often the case, it is found in extensive patches, with its numerous clusters of red or pink flowers, with their fragrant smell.

So general is this plant that it grows in every part of the British Isles, as far north as the Shetland Islands. And in the Highlands it may be met with at a height of nearly two thousand feet.

Many meadows are covered with Red Clover in bloom from May onward up till September. By the wayside, as well as in the meadow, it grows side by side with the Dutch Clover. Where one is extremely common the other may be scarce. The White Clover is a more vigorous creeping plant, and may oust the Red Clover in some places, as it is an erect plant, which does not spread by creeping stems.

Banks where the soil is sandy are especially favoured by this elegant trefoil, and railway banks are often covered with it.

The stems are rigid, erect, downy, hollow; the leaves are trifoliate, like most trefoils; the leaflets ovate, entire; the stipules blunt, with a subulate awn, appressed, with a central white spot.

The spikes of bloom are purple or red or pink, ovate, dense, sessile. The calyx is hirsute with subulate teeth, with ten veins, not so long as the corolla by more than a half. The seeds are contained in a pod, the top of which falls off when ripe.

As the tube is long, the honey at its base is only reached by long-tongued insects, and for this reason the Dutch Clover is the source of honey for the honey-bee. The nine anterior stamens form a tube with the claw of the petals. The insect's proboscis is inserted below the vexillum; when passing from the middle line posteriorly it is arrested by the posterior stamens. The broad base of the vexillum is continuous with the upper part of the tube and partly inferior by expansion of the free limb and base

of the carina. The two alæ are wide at the base and cover the stamens. The staminal tube splits posteriorly to include the tenth stamen. The style curves upwards so that the stigma exceeds the anthers and cross-pollination may take place. Butterflies and moths, flies and bees visit this clover.

As the pod is not a schizocarp the seeds are dispersed close to the plant itself.

Bee Bread, Broad Clover, Meadow, Red or Soukie Clover, Clatter Mallock, Clover Grass, Cock's Head, Cow Cloos, Cow Grass, Honey-suck, Honeysuckle, Trefoil, Marl Grass, Shamrock, Sleeping Maggie, Suckies, Sugar Plum are a few of the names by which it is known.

It was a talisman to detect fairies.

> "I'll seek a four-leaved Clover
> In all the fairy dells;
> And if I find the charmed leaf,
> Oh, how I'll weave my spells."

The Tufted Vetch (*Vicia Cracca*).

Like the Red Clover this pretty trailing or climbing vetch is found in every part of the British Isles up to the Shetland Isles, and in the Highlands grows at an altitude of 2400 ft.

There are few hedgerows where in spring and early summer this beautiful wild flower may not be found. Not only does it grace the hedge by the

roadside, where it may charm the passer-by, but it is to be found in most hedges of a medium size in fields and on the outskirts of woods. It is not a lover of deep shade like some of the vetches and vetchlings, but luxuriates in the sunshine, adopting a hedgerow habitat to maintain itself, owing to its need of some support by which to climb. In such positions it finds its way up to the top of the hedge, and the purple flowers are massed in close clusters as a crown at the summit. It makes a pretty contrast with its usual associates Red Campion, Bryony (white or black) brambles, Roses, the Hawthorn, and the tall welted thistle.

The stem reaches a great height, and is angular and furrowed, downy, slender, branching.

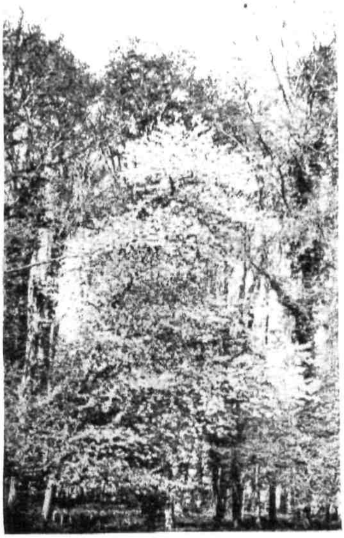
The leaves are pinnate, consisting of eight to twelve pairs of leaflets, which are oblong lanceolate, mucronate, with semi-sagittate, linear, subulate stipules. The leaves bear thread-like, long branched tendrils.

The purple flowers are in secund racemes, numerous, alternate. The tubular calyx is gibbous below, the pedicels are long, the teeth of the calyx are unequal and not as long as the tube. The style is downy above, the hairs longer below the stigma.

The stalked pod is short, with three black seeds and compressed.

The violet tufted vetch grows to a height of six feet. June, July, August are the months in which to find it in flower.

T. R. Goddard. FIG. 19.—TUFTED VETCH. *See page* 93.



W. Bell. FIG. 20.—GEAN. *See page* 98.

The short style with slanting hairs below the stigma forms a brush with the anthers around, which shed their pollen on them before the stigma is ripe, the hairs overtopping the stigma, and lying in the pouch of the carina, emerging when depressed by a narrow cavity at the tip of the alæ, which are united. The insect settles on the alæ, which act as levers, being connected at two points with the margin of the carina, a fold fitting in the pouch of the carina behind the pollen cavity. The alæ and carina return by an elastic movement to their position after an insect's visit, processes being adapted to accomplish this. The stigma becomes sticky when touched. The visitors are chiefly flies, bees, and some butterflies.

The pod has woody fibres arranged at half a right angle to the pod, and the valves curl up in cork-screw fashion, so that when they are dry the pods shoot the seeds out in all directions.

Blue Tar-fitch, Cat Peas, Cow Vetch, Wild Fetches, Huggaback Pea, Tar Grass, Wild Tare, Thetch are some of the names bestowed upon this lovely wild flower.

The Rose Group.

The Rose being the national emblem of England, apart from the beauty of the flower itself, this order is one of the most important in the British flora. The order contains 2000 species and 90 genera.

Five tribes or suborders have been distinguished, of which three are recognised in this country, *i.e.* those in which the fruit is a drupe, or Amygdaleæ with free stipules, including Plum, etc.; those in which the carpels are not included in the calyx and are distinct, and in which the stipules are united to the petiole, including Roses; Pomeæ in which the calyx-tube is thick and fleshy, adhering in fruit to the carpels, including Hawthorn and Apples, in which a one- to five-celled pome is formed.

The Rosaceæ include Sloe, Plum, Meadow Sweet, Great Burnet, Salad Burnet, Agrimony, Lady's Mantle, Sibbaldia, Cinquefoil, Marsh Cinquefoil, Strawberry, Bramble, Oak-leaved Mountain Avens, Geum or Avens, Rose, Hawthorn, Coton-easter, Medlar, Apple, etc.

In this order are comprised a number of plants valuable as fruit trees or garden flowers. The Plum, Sloe, Bullace, Cherry, Bird Cherry are examples. The first was doubtless introduced originally from Damascus, as it is not found in the middle but only on the outskirts of forests. From fruits of Bird Cherry, kirschwasser and ratafia are obtained. The Almond, Peach, Nectarine and Apricot are, of course, related to the Plum, but placed, except the last, in *Amygdalus*, in which the fruit is wrinkled or punctured.

Salad Burnet was used to flavour wine. The Bramble Group is an extensive one, including Dewberry and Raspberry, and about a hundred sub-

species, which, though not generally cultivated, except the last, are a stable crop gathered by country folk for the markets and in great demand in autumn. In the Bramble there are five sepals and five petals, as in most of this group, and many stamens and pistils, but the receptacle, not being hollowed out as in Roses, rises like a cone-shaped disc bearing the carpels in the form of drupes upon the persistent spongy receptacle, well marked in the Raspberry.

The Strawberry is a favourite garden fruit. The sepals are connate below, the stamens numerous, attached to the edge of the receptacle, which is cup-shaped, rising up in the middle.

The Rose is the most beautiful and most fragrant flower perhaps that can be named. The common Dog Rose in itself is a beautiful plant.

The Hawthorn is a useful plant not only for hedging and firewood, but grown as a separate bush or tree for its landscape effect in a park.

Cotoneaster, known in a wild state at Great Orme's Head, where it is protected, is a useful ornament also for walls.

The Apples, Pears, Quinces, Medlars, etc., are all of importance in the orchard. They have indefinite stamens in a ring attached to the throat of the calyx.

The Rosaceæ include trees and shrubs, as well as many herbaceous species. As a rule the leaves are alternate, simple or compound, with stipules in many cases, often adnate to the petiole, which is generally

long. They are reproduced by creeping stems as by runners in the case of a strawberry, or suckers as in a raspberry. The flowers are terminal, in cymes or racemes, variable in form and structure.

The receptacle is often hollowed, with a cone in the centre bearing the carpels, or they may be united to the receptacle and inferior.

The receptacle forms part of the fruit in many cases. The sepals are five, with an epicalyx of smaller outer leaves in *Potentilla*, and imbricate. The imbricate petals are five in number. There are two, three or four times as many anthers as there are petals, or they may be indefinite, and bent inwards in the bud. The carpels exceed the petals two to three times or are indefinite or one to four. The fruit is an achene, drupe, or pome. Usually the anthers are ripe first. In Great Burnet the flower is wind-pollinated. The honey is easily accessible, and the flowers much visited.

THE CHERRY (*Prunus Avium*).

The Gean, as this wild cherry is also called, is much more common than the cherry (*P. Cerasus*), which is the origin of many of our garden forms.

Most boys know the whereabouts of a cherry-tree in their school-boy days to which they repair at the right season, as they do to the Crab tree later in the year to obtain the fruit. I remember some very tall cherry-trees which used to grow upon the summit of Box Hill in Surrey, to which we were allowed as a

B. Hanley. Fig. 21.—Flowers of Sloe (enlarged). *See page* 100.

A. R. Horwood. Fig. 22.—Sloe Flowering before the Leaves. *See page* 100.

special favour (since it was out of bounds at other seasons of the year) to visit for the Exeat, when more lucky members were able to take a holiday, to stay with their relations for the brief mid-term lull in the work.

The cherries called Geans, Hearts, and Bigaroons are derived from this species, whilst the Wild Cherry or Dwarf Cherry is the origin of the Morello, Duke, and Kentish Cherries. As implied by its second name it is not so tall a tree as the Gean, seldom exceeding 8 to 10 ft. in height, whilst the Gean may grow to a height of 20 ft.

The trunk is often thick, straight, with smooth, umber bark, branching above with a series of straight branches which radiate from a centre. The leaves are long-petioled, ovate, with an acute point, downy below, drooping (in *Prunus Cerasus* they are glabrous). The flowers are white, several in an umbel, drooping, whereas in *P. Cerasus* they are erect.

The calyx tube is narrowed below the sepals, which are entire. The petals are flaccid, not firm. The fruit is heart-shaped, not round. The fruit is small and bitter, black or red, the fruit of *P. Cerasus* being always acid and red.

The kernels when eaten are poisonous, containing prussic acid. Death has resulted from eating them in quantity.

Johnstone says—" The only immediate remedy for poisoning by prussic acid is pouring a stream of cold water from some height upon the head and spine.

The effect of this poison is narcotic, and owing to its rapid action on the nervous system, a convulsive contraction of the muscles of the jaw generally prevents the use of emetics."

The Blackthorn (*Prunus spinosa*).

The snowy white blooms of the blackthorn in early Spring dotted over the country make the same effect that the Whitethorn or May does in May. And when all the hedges are leafless the contrast with the black stems and branches is all the more striking.

Blackthorn is found in every county and grows at a height of 1300 ft. in Yorkshire.

The Sloe or Blackthorn forms scrub or bush on the outskirts of woods, indicating a return of meadowland to a more natural state, or from primitive woodland to scrub.

This scrub occurs in the midst of true woodland, and on the outskirts may also be natural. It is frequent in hedgerows and on the sides of roads, where it is usually planted. This gregarious or social habit gives it a distinctive character and is general, save where it is found isolated amongst Hawthorn, Cornel or Buckthorn in the hedgerow.

Sloe has the bush habit. It may be recognised, as the second Latin name implies, by the marked spinous character of the branches, and by the zigzag arrangement of the ultimate branches. The Bullace lacks these two characters, and the branches are more erect,

whilst whereas the flowers appear in Sloe before the leaves, in the Bullace the flowers appear later.

The branches are rigid, black ; the leaves are ovate, elliptic with down on the under-surface, and are petiolate, and convolute at first.

The white flowers are large, shortly stalked, solitary, the petals obovate. The free calyx is deciduous. The globose glaucous fruit, which is acid, is a drupe.

Blackthorn reaches the height of 15 ft., flowering in March and April.

The style is longer than the stamens, which are closed before the stigma is mature, and bends down towards the centre. Insects thus touch the stigma first. Later the petals become horizontal and the stamens become erect and incline outwards, dehiscing outwards. The flowers are turned to the sun. There is honey in the flowers. As pollen may fall on the stigma the plant may be self-pollinated. Bees, etc., flies, beetles, and the peacock butterfly are frequent visitors, the flowers being very conspicuous at a time when there are few in bloom.

The edible fruit is dispersed by the agency of birds.

Blackberry, Buckthorn, Bullens, Bullister, Cat Sloes, Egg Peg, Hedge Peaks, Quick Scrog, Skig, Skaathorn, Slea, Sloe, Slacen bush, Sloo bush, Snag bush, Winter Picks are but a few of the local names for Blackthorn.

In Surrey they say it is "always cold when the Blackthorn comes in flower." When the Sloe tree

is as white as a sheet, "sow your barley whether it be dry or not."

The fruit is astringent. A conserve or jam is made from it as well as Sloe gin and port wine. Marking ink used to be made from it.

MEADOW SWEET (*Spiræa Ulmaria*).

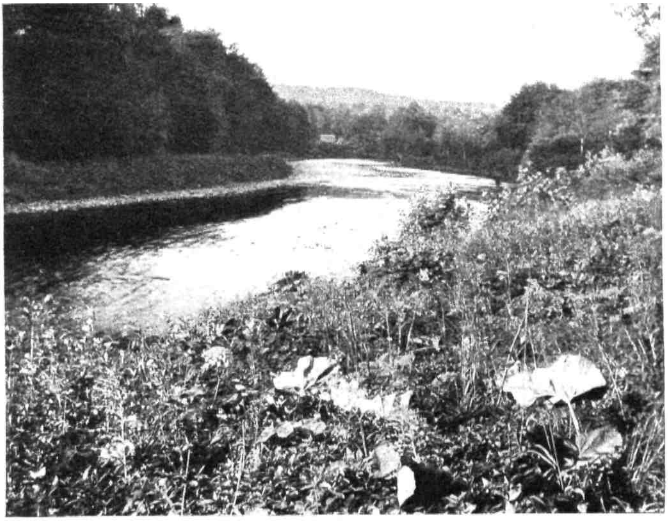
Forming wide patches, especially in low-lying ground, Meadow Sweet is an unfailing indication of the near proximity of a stream, river, or ditch, luxuriating in the silt brought down by either of these.

Lovely flower as it is there is little wonder that it has received the name of Queen of the Meadows. It is found in every British county as far north as the Shetlands, and grows at a height of 1200 ft. in Yorkshire.

It may be found in wet meadows, by the sides of ditches, streams, ponds, and rivers. It also grows commonly in marshes, where it thrives to the exclusion of other less vigorous plants, being a moisture-loving plant. With it grow Meadow Crane's Bill, Willow herbs, Figwort, Marsh Bedstraw, Docks, Sedges, Rushes and other water plants that grow on the margins of aquatic habitats.

Meadow Sweet is a tall, erect plant, with a rigid angular stem, seldom branched, more than one stem arising from one root.

The root-leaves are pinnate, ovate, the terminal leaflet larger and divided, dark-green above, downy



G. B. Dixon. FIG. 23.—MEADOW SWEET. *See page* 102.

B. Hanley. FIG. 24.—BRAMBLE. *See page* 104.

and white beneath. The surface is uneven and wrinkled. There are rounded denticulate stipules. The lateral stem leaves are entire.

The flowers are white or creamy white in a compound cyme or corymb, erect, and downy, with lateral branches. The downy calyx is ultimately reflexed. The oblong petals have a claw below. The stigma is capitate. The five to six spirally twisted capsules are glabrous.

Meadow Sweet grows to a height of 2 to 3 ft. Flowers can be found between May and October.

The flowers possess abundant pollen but no honey, and many insects visit them. The flowers are too fragile for insects to settle upon them, so that they grasp the stigma and in so doing cross-pollinate them, though if the flower is not visited self-pollination ensues. The stamens bend over to the centre and cover the stigma, afterwards becoming erect again, bending outwards. When the anthers open they are covered with pollen. After the stamens become erect insect visitors alight upon them also. Bees and beetles are the principal visitors.

The follicle splits open and the seeds are dispersed at no distance from the plant.

Bittersweet, Bridewort, Courtship and Matrimony, Goat's Beard, Harif, Honeysweet, Maid of the Meadow, Maid-Sweet, Meadow Soot, Meadow Sweet, My Lady's Belt, Queen-of-the-Meadows, Sweet May are the names that have been bestowed upon this lovely wild flower.

It was, as some names suggest, used at wedding festivals, for strewing about the house.

> "Amongst these strewing kinds some others wild that grow
> As burnet, all abroad and Meadow wort they throw."
>
> *Drayton.*

BRAMBLE *(Rubus rusticanus)*.

Probably few people are aware that there are nearly a hundred different species of Bramble or Blackberry. This is possibly due to the fact that they are so very similar, and also in part to the fact that in some districts, beyond the Raspberry and Dewberry, which are well-marked, there are few species beyond the one here chosen for description and one or two others. The more specialised species grow in woods in different parts of the country.

This species, which is perhaps the commonest, is found in a large number of the English and Scotch counties, but is not so general in the latter as in the former.

The common bramble, as we may designate the plant under notice, is not only an extremely abundant plant in the hedgerow, along the roadside, and in fields and meadows, but it forms undergrowth in woods also, though it is more particularly a sun-lover. It is frequently a large component of the scrub of commons and heaths, and there prevails to the exclusion of all other plants, except the Dog Rose and the Hawthorn.

The Bramble habit is extremely characteristic,

resembling most that of the trailing Dog Rose. There are numerous stems, at first ascending, originating from a single root, growing horizontally and then arching over, rooting again in the ground, and thus forming a mass of interlacing entanglements which any scout who has negotiated them will find as impenetrable as barbed-wire. The stems are armed with sharp, broad-based, strong prickles, at intervals. The different species of bramble are largely identified by the character of the prickles and glands upon the stem, as well as by the leaf characters, and those of the panicle of flowers.

In this species the leaves are digitate, and the leaflets oval-oblong, greyish-white beneath.

The flowers are pink, with a whitish calyx, felted in the same way as the leaves. They are erect, in long panicles, with many flowers. The fruit is especially noted for the very gritty nature of its seeds.

The plant reaches a height of 10 ft. or more. The flowers are in bloom between July and September.

The flowers are rendered conspicuous by their outspread character, the stamens also spreading out, and the honey disc is easily reached by insects. The outer row of stamens first opens when the stigmas are ripe; the inner row then becomes erect, and, touching the stigma, self-pollinates it. Bees, wasps, flies, beetles, butterflies are frequent visitors.

The fruit, which is a collection of drupels on a convex receptacle, is eaten by birds.

Broomles, Brumble, Brummel Kilts, Bullbeef, Cock

Brumble, Country Lawyers, Ewe Bramble, Gaiter Tree are a few names given to it.

THE DOG ROSE (*Rosa canina*).

Like the May or Hawthorn the Dog Rose is one of the most popular of flowers, besides being as a rose the national emblem of England. It is found as far north as the Orkneys, and at an altitude of 1350 ft. in Yorkshire.

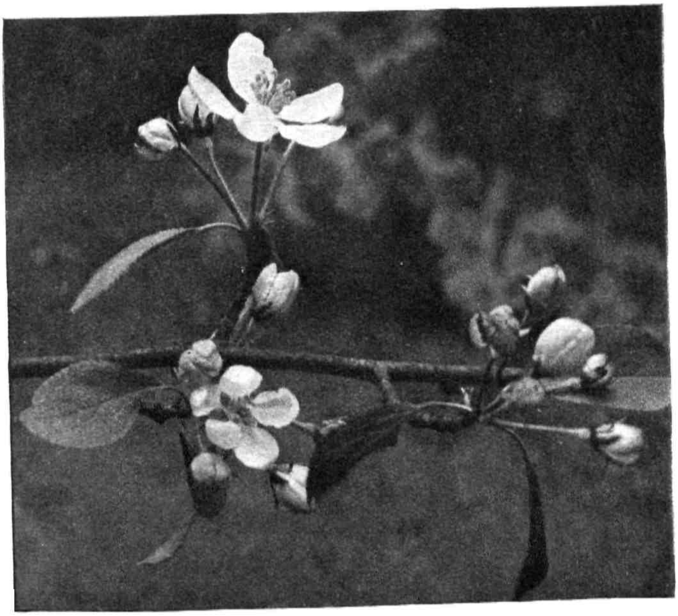
A certain place in which to find the Dog Rose is a hedge by the wayside, where it forms a safe nesting-place for many small birds, and grows side by side with the Bramble, Hawthorn, Apple, Elder, Blackthorn, Cornel, Privet, and other hedgerow plants. In the same way it is common in the hedges in fields and meadows, where it forms a strong fence, often projecting with its prickly branches some distance from the hedge, and is an effective deterrent to the marauding birds-nester, or the poacher, in the dark being also a menace to wandering cattle.

It is also a common component of the scrub in woods and of the undergrowth, as well as of commons and heaths with furze and other plants that possess protective means of warding off the attacks of browsing cattle.

It is a climbing or trailing bush, tall, arching over above, very graceful in habit. The stem is green or purple, with numerous equal recurved prickles, smooth and glossy.

The leaves are pinnate with simple or double

B. Hanley. FIG. 25.—ROSE (in fruit). *See page* 106.



S. Crook. FIG. 26.—CRAB APPLE (in flower). *See page* 108.

serrations, with ovate serrate leaflets, the upper surface of which is shining, the lower glabrous or hairy.

The flowers are white or pink, or pinkish-white. The sepals are reflexed, deciduous, pinnate. The petals are obcordate. The peduncles, which have no glands, are smooth. The styles are prominent and hairy.

The bush is often 8 to 10 ft. in height. Flowers are in bloom in June and July.

Where the stamens are attached to the receptacle there is a thick fleshy ring surrounding the styles, which just protrude. The flowers possess abundant pollen but no honey. Insects are attracted readily by the conspicuous flowers, which are fragrant. The ring around the styles is at first inclined outwards, the petals being sub-erect.

Insects alighting upon the fleshy ring and the stigmas and touching it first with pollen from another flower so cross-pollinate it. The anthers and stigma are ripe at the same time. It is visited by flies, beetles, etc.

The fruit, being edible, is dispersed by birds.

Bird Briar, Horse Brear, Hep Briar, Brimule, Buck Breer, Buckie Berries, Canker Berry, Canker Rose, Cat Choops, Cat Hep, Cat Jugs, Cat Whin, Chowps, Cowitch, Daily Bread, Dog Berry, Dog Jumps, Eglantine, Hedge Peak, Hip Briar, Red Berries, Pixie, Pears, Soldiers, Yew Brimule are names given to this well-known and well-beloved wild flower.

CRAB APPLE (*Pyrus Malus*).

The Crab Apple is a common plant which is found in all parts of the British Isles except in a few counties in Wales and Scotland.

Woods and copses are the usual habitat of the Crab Apple. It is also to-day commonly found in hedges by the wayside, where it is, like the rest of the hedge plants, always planted, unless it comes up, as it may do, spontaneously. Similarly it is frequent in the hedges of fields and meadows, where it is allowed to grow to the size of a tree.

Sometimes a few trees may grow in the open, where in some cases they are the remains of former hedges. Solitary trees are often to be found in parks, where they are often ancient and well-developed. The common associates of the Crab in the hedgerow are Hawthorn, Elder, Sloe, Rose, Bramble, Cornel, Guelder Rose.

It may frequently near villages be a reversion of the cultivated apple to a wild state.

The trunk is straight, with thin, rimose bark. Very often it has a decided list. It is usually more or less erect, and symmetrical in habit. The main stem divides into numerous smaller branches some distance from the ground, which are spreading and drooping. The leaves are ovate, simple, serrate, acuminate, smooth or downy.

The flowers are white or pink, and sweet-scented, there being two varieties. They are arranged in sessile

B. Hanley. FIG. 27.—CRAB APPLE (in fruit). *See page* 108.

J. H. Crabtree. FIG. 28.—HAWTHORN (in flower). *See page* 110.

umbels, and are few in number. The calyx is downy. The claw is not so long as the calyx, combined below, smooth.

The fruit is a globose pome, at first green, then yellow or red.

A crab tree is often 20 ft. in height. It is in flower in April and May.

The stamens are overtopped by the five stigmas, which ripen first. The flower is conspicuous and the honey easily reached so that many insects visit the flower, cross-pollination necessarily following, though if insects do not visit the flower it is self-pollinated. The flowers turn towards the light, laterally, and in this way pollen can fall upon the stigmas. Humble bees, hive bees, etc., and numerous flies visit the flowers.

As the fruit is edible it is dispersed by birds.

Apis, Aplya, Applelyn, Apple John, Appe, Appulle, Bittersgall, Bittersweet, Cats' Heads, Coling, Crab, Crabstock, Grab, Grabstock, Gribble, Koling, Leather Jacket, Morris Apple, Nurse Camden, Pomewater, Sap, Scarb Jacket, Scrab, Screyt, Scrog, Star Apple, Well Apple, Wilding are names by which the Crab Apple is known in different parts.

In reference to the name Bittersgall, it was remarked of a silly person that "He was born where the bittersgall da grow, and one o'm fall'd on his head, and made a zaate (soft) place there."

HAWTHORN (*Cratægus Oxyacantha*).

The first Latin name has reference to the hardness of the wood, a well-known feature, the second to an equally characteristic peculiarity, the sharp-pointed thorns by which the stem and branches are everywhere thickly beset.

On this account the Hawthorn is one of those plants which are particularly well-fitted to cope with others and their surroundings in the struggle for existence. In the Midlands they are perhaps better developed than in any other part of the country, for the well-known " bullfinches " are a particular feature of the Shires famed for their excellent hunting attractions.

In the British Isles it grows everywhere except in the Orkneys. In Yorkshire it is found at a height of 1800 ft. It is probably so wide-spread owing to extensive planting since the prevalence of enclosures, and may not be native everywhere, though now it is doubtless largely rendered so by dispersal by birds from planted hedgerows.

It is nowadays largely a hedgerow plant, where owing to layering it is, if kept down, different in habit to the uncut tree in the hedge or in the open. It is frequent in parks, where it attains a large size, being tall and wide-spreading.

It has an erect trunk, often twisted, with rimose bark, branching at some distance from the ground. The English name Hawthorn means hedge thorn, hence it was probably very early used for fences

B. Hanley. FIG. 29.—HAWTHORN (in fruit). *See page* 110.

G. B. Dixon. FIG. 30.—BEAKED PARSLEY. *See page* 114.

around homesteads. The branches are large, spreading, often twisted, horizontal, and then erect, or drooping at the extremity, where there is a network of fine twigs. The leaves are blunt, serrate, with three to four lobes, wedge-shaped at the base.

The flowers are white and form a cup, being arranged in a corymb, and the peduncles are smooth or downy, like the calyx. There may be one, two, or three styles, according to the form in which they occur, and they may be bent back. The anthers are puce when mature. The fruit or haw is globose, containing a hard stone.

The Hawthorn grows to a height of 15 ft. It flowers in May and June.

The stigmas, as in the Rowan, are mature first. The stamens bend outwards, so that the flower is usually cross-pollinated, if insects visit it. The outer stamens shed their pollen two or three days after the flower is open. There is no honey, but the flowers are odorous and attract dung and flesh flies. In the absence of bees, etc., self-pollination occurs. Bees, flies, beetles, etc., are numerous and frequent visitors.

The fruit is edible and dispersed by birds.

Agald, Albespyne, Aglet, Aubepyne, Azzy Tree, Bird Eagles, Bird's Meat, Bread and Cheese are but a few of the names given to it.

The Hemlock Group.

Whilst the order Umbelliferæ forms a more or less natural group distinguished by the form of the

cases named. Below each umbel is an involucre of bracts, and at the top of each partial umbel is another involucre of bracts, or involucel as it is named in this case. In the Carrot there is a terminal flower. The simple umbels are often cymose, as in Sanicle and Sea Holly.

The flowers are regular, the sepals are small (five), the odd one posterior. The corolla consists of five petals, white or cream, and there are five anthers which open inwards.

The flowers are closely grouped so that they are very conspicuous, and some of the outer ray flowers are larger. Honey is secreted within the disc, and easily accessible to insects.

BEAKED PARSLEY (*Anthriscus sylvestris*).

This umbelliferous plant is one of the earliest plants, the earliest species, to flower, and from this fact alone may easily be recognised, though it belongs to a group of plants which are very difficult to identify without long acquaintance with them.

It grows in great patches in fields and meadows, forming dense brakes in woods and plantations. It is so vigorous a plant that it destroys the grass around its wide-spreading foliage for some distance, and is therefore a pest to the farmer.

Its characteristic smell in spring imparts quite an aroma to the neighbourhood of its habitat. People in the country call it Kek or Kirk, and it is often

used to feed rabbits, from which reason the latter are detestable to many people, or even poisonous, as Kek contains some principle, like many umbellifers, of a noxious character.

The root is long and deeply rooted, with branching rootlets which make it difficult to eradicate it, as the least bit left in the ground appears to have the power of starting a fresh plant into existence.

The stem is hairy below, with a whitish down, erect, hollow, reddish-white in parts, stout, bearing numerous leaves.

The leaves are two to three times pinnate, and are dark or light green, varying greatly in appearance in this respect and in the toothing and division of the leaflets, which are pinnatifid, ovate, and coarsely serrate. There are no bracts. The bracteoles, as they are called, are oblong, lanceolate, ciliate, green, spreading or turned down, and are often pink. The flowers are in umbels with a peduncle, and terminal; the flowers are white, the fruit glabrous, a quarter of an inch in length. The fruit has a short beak, and the carpels are smooth. The stem is 3 to 4 ft. high. The flowers are in bloom from April to June. It is a perennial.

The numerous small flowers in large flat heads render the flower conspicuous, and each contains honey accessible to all insects. There are five petals, and five stamens alternate with them. The anthers ripen first. Over seventy different kinds of insects were noted by Muller as visiting this plant.

ANGELICA (*Angelica sylvestris*).

Tall and graceful Angelica is a wide-spread species which is found in every county in the British Isles and at a height of 2700 ft. in the Highlands.

Low-lying ground is the special habitat of Angelica, which delights in a moist, damp situation, growing abundantly in shady spots, forming a society in itself. Woods and plantations on wet soil are the sort of habitat especially required by Angelica. Though it is more common at low elevations, it may also be found at higher elevations on moist mountains. The borders of streams are also suitable spots for Angelica, where it grows with Willow herbs, Meadow Sweet, Sedges, Rushes, Reeds, and other aquatic plants.

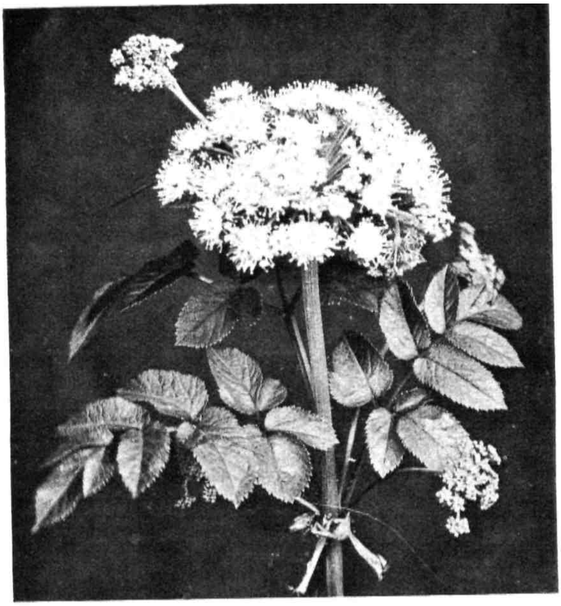
The stem is tall and erect, hollow, furrowed, and purplish-red in colour, with a certain amount of down.

The stem is branched, and bears large wide-spreading leaves, which are deltoid and bi-pinnate, with a large sheathing base.

The leaflets are ovate, pinnate, serrate, unequal at the base, lanceolate and subcordate below.

The numerous pinkish-white flowers are closely aggregated together in a large involucre.

There are several rays, and a general and partial involucre or involucel. The nearly regular flowers have no calyx teeth. The fruit is ovoid, compressed, the seeds flat ventrally.



J. H. Crabtree. FIG. 31.—ANGELICA. *See page* 116.

C. Mosley. FIG. 32.—IVY (in fruit). *See page* 119.

Angelica grows to a height of 5 to 6 ft. The flowers are in bloom from June to August.

The numerous white or purple flowers are more or less conspicuous. The styles are reflexed. As the plant is sweet-scented the chance of being pollinated by insect agency is considerable, as pollen is abundant.

The visitors include flies, wasps, bees, butterflies and other insects.

The seed, having a flattened margin, is adapted to dispersal by the wind.

A number of names have been given to this plant besides the general one Angelica, such as Aitskeiters, Ground Ash, Ground Elder, Hemlock, Jack jump about, Keck, Kecks, Keglus, Keks, Kex, Trumpet Keck, Kelk, Kecksy, Water Kesh, Kewsies, Kesk, Skytes.

The name Aitskeiters is for oat-shooters, as children shoot oats through the hollow stems in the same way as peas from a pea-shooter.

Parkinson says that "in Sussex they call the wilde kinde (of Angelica) Kex, and the weavers winde their yerne on the dead stalkes."

Trumpet keck refers to the habit of using the hollow stems as trumpets—a custom amongst boys in the country.

THE IVY GROUP.

Of the order Araliaceæ there are two British species—Ivy and Moschatel. There are about five

hundred species, which are mainly found in the Tropics, in the Indian and Malay regions, and America. In *Gunnera* the leaves are 8 ft. in diameter or as large as a cart-wheel, and like Rhubarb.

These plants are trees, shrubs, or herbs. The Ivy is a climbing or trailing plant.

Ginseng is derived from *Panax quinquefolium*, a medicine used by the Chinese being made from the roots, and allied species yield aromatic medicines, used by the natives of the Moluccas. The wood of some forms of Ivy yields also scents, or aromatic gums. Moschatel is known by its musky scent, and its single peduncles with four flowers below and one above, and the delicate ternate leaves and white soboles.

There are five calyx lobes in the flower of Ivy, three in that of Moschatel, and in the former they are inserted on the ovary, and in the latter above the base of the ovary, beside which there are several other differences.

The habit is that of a tree or climbing plant in Ivy, in *Adoxa* of a dwarf herbaceous plant with the Anemone habit.

The leaves are usually alternate, large and compound in some foreign species, simple and entire, with lobes in Ivy, ternate in Adoxa. There are small stipules. The flowers are small and whitish, often massed into large compound inflorescences. The flowers are regular, in umbels or capitate, with five lobes. The calyx is small and short-toothed or lobed,

with five segments. The petals are five in number, four or ten, or wanting, and the stamens are of the same number with filaments inflexed, inserted on the ovary, the anthers in two rows and versatile. The styles are free or united, or absent, as many as the cells in the ovary. The stigma is terminal or decurrent, on the inner face of the style.

The fruit is a drupe with as many stones as there are carpels, or it may be a berry.

In *Adoxa* the fruit is deflexed after flowering. It may be fleshy or dry. The seed is pendulous, with thick albumen.

Ivy (*Hedera Helix*).

Even if there were not many trees in every country district covered with Ivy or church towers immortalised by Keats as clad in an Ivy mantle, this unique plant would find favour in the popular mind. There is no need indeed to point out its very characteristic features, for every boy and girl can name a specimen of Ivy without recourse to books or descriptions.

The form of the leaf, the climbing or trailing habit, the late flowers and black berries in winter and its evergreen character serve from a general point of view to distinguish it.

It is universal, and found at a height of 1500 ft. in Yorkshire.

As it needs usually the support of trees, upon which

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It is universal, and found at a height of 1500 ft. in Yorkshire.

As it needs usually the support of trees, upon which

it lives as a parasite, as it were, though not in the ordinary sense, the climbing form is most usually found in woods and plantations, on the sides of cliffs, where it clings to bushes or to projecting rock-surfaces, in gardens, hedgerows in fields and meadows, and by the roadside.

Probably its original habitat was a woodland. But it seems equally at home on rock surfaces, where it climbs vertically. There is a trailing form, however, which does not develop a thick main stem and branches, growing in hedge bottoms and amongst undergrowth, and this apparently does not flower. But this last will, when the opportunity occurs, merge into the climbing, more vigorous plant.

The habit of Ivy is thus climbing or trailing. In the former the stem may be thick with an ashy bark, covered with root-like suckers which enable it to cling like a leech to its support. The bark when old is cracked and rimose. The younger branches are green or purple in colour. The stem is often thickened at the base, branching above with equal forks, twining around the trunk or clinging to a wall, continually ramifying as it grows taller and taller.

The leaves are trilobed or five-lobed, oval, cordate, entire, and thick in the upper flowering branches, with white or reddish veins.

The flowers are yellow, on peduncles in umbels, and rather crowded, erect and downy.

The black berries are globose, purple within, with four to five cavities. The style is persistent.

Ivy reaches a height of 40 ft. and completely envelops a tree when left to grow, often suffocating its support and killing it; hence under good methods of forestry it is usually destroyed when covering a tree. The flowers are in bloom in October and November.

The flowers are polygamous and the anthers mature before the stigma. The petals are not persistent, the flowers yellowish-green, and in spite of this beetles visit them, as well as flies and wasps. The stamens are as long as the corolla, and are inflexed. The anthers, bifid below, are incumbent.

The style is quite short. The simple stigma is terminal.

The fruit being edible the seeds are dispersed by birds.

Ivy is also known by the names of Benewith Tree, Bentwood, Bindwood, Evy, Ground Ivy, Hyven, Ivin, Ivory, Barren, Black Ivy, Creeping Small Ivy, Wood Bind.

Barren Ivy applies to the trailing form.

"To pipe in an ivy leaf" is to engage in a futile pursuit. The unity of wisdom and conviviality is expressed in the saying, "An owl in an ivy bush."

CHAPTER III

GAMOPETALÆ (COROLLIFLORÆ)

IN this group the flowers have both calyx and corolla, being dichlamydeous, and the petals are united. The petals bear the stamens and are connate, and united into a two or more lobed corolla. The group is also called Monopetalæ or Corollifloræ.

When the ovary is inferior the stamens are epipetalous, when superior the stamens are also epipetalous, and the corolla may be regular or irregular.

In some Ericaceæ the petals, however, are free, as in Pyrola and Monotropa, and in Plumbagineæ. There is no corolla in Oleaceæ, in Fraxinus, or in Glaux amongst Primulaceæ.

Instead of being epipetalous the stamens are hypogynous in Ericaceæ and Oleineæ, in Fraxinus, in Littorella, in Plantagineæ, and in Plumbagineæ.

There are twenty-three families in this group, of which we have included nine, and we have described twenty species in illustration of these families.

THE WOODBINE GROUP.

The plant which gives its name to the order Caprifoliaceæ is the Woodbine. There are about twenty-eight species, which inhabit the northern temperate zone and hilly parts of the tropics. The plants included in this group were formerly united with Rubiaceæ but have been separated because they possess stipules. They have been grouped in four divisions: Elder group with pinnate leaves and anthers opening outwards; Guelder Rose Group with simple or lobed leaves, anthers opening inwards, with one ovule in each loculus; Symphoricarpus group, with the same characters, but two loculi and many ovules; and the Honeysuckle Group, with many ovules in the loculi.

They include Elder, Guelder Rose, Honeysuckle and Linnæa amongst British plants. The last was called Nummularia, but Linnæus desired that it should receive a name to commemorate himself.

They grow as a rule in woods and hedgerows, the Mealy Guelder Rose being native upon the Chalk Downs. The Elder is often planted near houses, because of its use as firewood, the berries being made into wine, and it has several medicinal properties.

They are shrubs or trees, or herbaceous.

The Honeysuckle is a climbing plant. The wood of the Elder is pithy. The leaves are pinnate, decussate, with stipules in Sambucus. The flowers

are regular, in cymes, and the calyx has five sepals, the odd one posterior.

The stamens are in one whorl, borne upon the petals. The fruit is a berry or drupe. The anthers dehisce either outwards or laterally.

The dwarf elder is nauseous and fœtid, and has a herbaceous stem, rarely exceeding 3 ft. in height; the cyme is three-cleft. It was used as an emetic.

In Kent orchards of Elder have been cultivated for their berries. The flowers distilled in water and alcohol yield a perfume, Elder flower water, used for the toilet.

The cultivated form of the Guelder Rose with all neuter flowers, like those in the ray in the wild form, called the Snow Ball, is often planted in shrubberies.

Elder (*Sambucus nigra*).

Like the Ivy the Elder is one of those common plants that everyone knows, and it does not require a botanical knowledge of plants to identify it. The number of such plants as education progresses will, it is to be hoped, proportionally increase. None the less we do not for a moment urge the recognition of plants by any other than the scientific method of ascertaining their identity by means of a key to the known botanical characteristics, which practice alone makes perfect, and which has at the same time the effect of developing powers of discrimination, observation, of patience and an infinite capacity for taking

B. Hanley. FIG. 33.—ELDER (in flower). *See page* 124.

J. H. Crabtree. FIG. 34.—ELDER FLOWERS (enlarged). *See page* 124.

pains, to which may be added the clear grasp of fundamental principles.

The Elder is found in every part of the British Isles except in Cardigan, though in Scotland it is not regarded as native. Indeed, from a variety of reasons, superstitious, medicinal and others, it is frequently planted near houses and villages, apart from its introduction into woods and hedges by the same agency.

Nowhere is it more common than by the roadside or in the hedgerow in a field or meadow. And a thick scrub of Elder is often to be met with in woods and plantations, especially those of recent origin.

The Elder has a bush or tree habit. The stem is thick with a furrowed ashen bark, filled with a soft pith, the wood close and hard, but as a whole brittle. It is usually erect or sub-erect, branched, with warty outgrowths. The branches are straight and slender, arching above. The young twigs are angular and covered with small raised pimple-like excrescences. The leaves are pinnate, the leaflets ovate, acute, dentate, smooth, dark above, lighter beneath.

The flowers are creamy-white, in close clustered large cymes, the corolla rotate, with few or no stipules on the panicle.

The berries are black when ripe, purple within. Elder grows to a height of 15 ft. The flowers may be met with in June.

There is no honey. The flower, however, is sweet-scented, and there is abundant pollen. The numerous

flowers render it conspicuous. The stamens and pistil mature together as in Moschatel, and self-pollination occurs more frequently than cross-pollination. Flies and beetles are the chief insects that frequent the Elder.

As the fruit is edible the seeds are principally dispersed by the agency of birds as in the case of most fruit-trees.

Aete, Alderne, Arntree, Bawtree, Boon Tree, Boor Tree, Bootry, Bore, Borral, Bothery Tree, Bull Tree, Dog Tree are only a few of the local names by which Elder is known.

The Teasel Group.

The teasel habit is a well-marked one, the stem being erect, with the opposite, half-erect, connate leaves, which are so interesting a feature of this plant, giving it a distinctive character.

Teasels generally grow in close association in clumps on the banks of a hedge or roadside, frequently by streams. As they are regarded by farmers as a nuisance they are thus driven to such resorts where they are considered less harmful than in the open fields, where if they grow they are protected from being browsed down by animals by the hooks on the stem and foliage, and the bristles of the flowerhead.

Formerly, before mechanical methods of carding wool were invented, a teasel called Fuller's teasel

with hooked bracts which were recurved was employed. The heads were inserted in a frame and caught up loose wool, etc., that might be intermixed with woven cloth.

I have found this teasel on the outskirts of towns quite recently, showing that it has been employed for this purpose in comparatively recent times.

There are two British species of teasel, the common one having blue or lavender flowers, and in this form the head is long and conical, the leaves are sessile and the bracts are turned up. In the smaller, more local species, the flowers are white, the whole plant is covered with bristles, and the leaves are on stalks, whilst the bracts are recurved and the head is subglobose.

In Dipsacus, so-called because the connate leaf-bases are often filled with water as though the plant were thirsty, the bracts are spinose and exserted and cover the head of flowers. In Scabiosa the bracts are either concealed or are scale-like or absent. In Knautia, now merged with Scabiosa, the outer calyx is small with four teeth.

The Dipsaceæ are herbaceous perennials or biennials, of which there are about a hundred and fifty species.

The leaves are opposite and connate, with no stipules, or whorled. The flowers are in cymes or heads, capitate, with an outer involucre of bracts and an inner row beneath the flowers. The epicalyx is attached to the ovary. The outer flowers have the

corolla drawn out on one side. There are five sepals and petals, or four when there is a union of two.

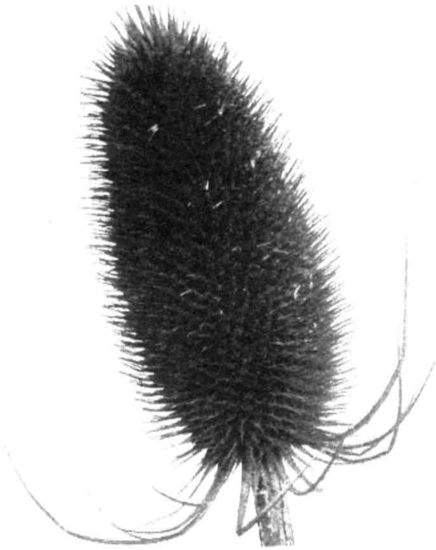
The corolla is tubular. The four stamens are epipetalous. There is one style and the stigma is undivided. The anthers mature first. The fruit is an achene enclosed by the epicalyx, indehiscent, crowned by the pappus-like limb of the calyx.

TEASEL (*Dipsacus sylvestris*).

This tall handsome plant is one of the most striking British species. It is general throughout the country and may be found in nearly every county.

Growing in clumps it is a conspicuous object along the roadside, and is especially common on banks in hedgerows, rearing its stately stem above the majority of the hedge-plants and overtopping the low hedge itself. Another favourite habitat is the moist border of a stream or river, where in the spring the conspicuous rosette of long lingulate leaves is readily detected.

The stem is erect, single below, branched above. It is cylindrical but furrowed and bears spines at intervals, especially towards the top around the flower heads. The spines are long and sharp. The radical leaves are notched and rough, and lie on the surface. The stem leaves are connate below, water collecting in the axils, where basins are formed in which insects are drowned and absorbed. The leaves are ovate acute, serrate, bearing spines on the midrib, and are opposite.



B. Hanley. FIG. 35.—TEASEL HEAD. See page 128.

B. Hanley. FIG. 36.—COLTSFOOT. See page 132.

The lilac flowers open first in the centre of the flower-head. The involucre contains numerous exserted scales; the bristles are curved upwards, and are longer than the flowers. The flower-head is conical. The calyx is patelliform.

Four to five feet is the usual height of the teasel. Flowers may be found in July.

The anthers mature first, the tube of the flower being long. The style is bilobed, the lobes being intermixed. The stigmatic papillæ are numerous, one or more being abortive. Radiating spines cover the stigma, overtopping the anthers and stigmas so that a bee does not touch them with its ventral surface, but with its head when inserting it in the flower, one stigma being in the way of the other, so that for the stigmatic surface to be rubbed by the bee it is of advantage that one be abortive. Species of Humble bee are frequent visitors.

A parachute arrangement is provided for the dispersal of the seeds, which are scattered by the agency of the wind.

Adam's Flannel, Barber's Brushes, Sweep's Brushes, Card Teasel, Card Thistle, Church Brooms, Gipsy's Combs, Prickly Back, Tazzel, Venus Bath or Basin are names given to this Teasel.

THE DANDELION GROUP.

The Compositæ, as the name indicates, consist of an order in which the so-called or apparent flower is

The ray florets open and the stigmas ripen before the anther cylinders of the disc. Unless insects affect it self-pollination does not occur. The Hive Bee and other bees and flies visit the Coltsfoot.

The seed is dispersed by aid of the parachute arrangement of the pappus by the wind.

Ass's Foot, Bull's Foot, Clatter Clogs, Clayt, Clayweed, Cleats, Clot, Coltherb, Coughwort, Coalfit, Cowheave, Dove Dock, Dummy Weed, Foalfoot are a few of the many names by which it is known.

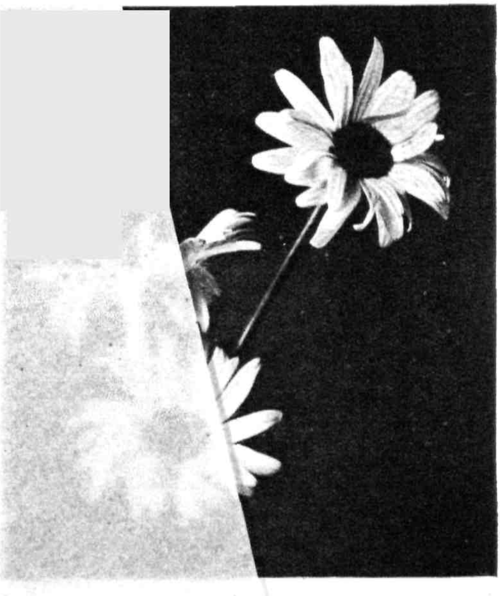
DAISY (*Bellis perennis*)

No county in the British Isles is without its daisies, and it is found at a height of 3000 ft. in the Highlands. It is an extremely popular flower with which everyone is familiar.

But it rarely grows in woods, and is absent from wet places, preferring a dry soil. One does not find it also as a rule on heaths, especially those which are covered with Heather and heath, but it grows on commons with Furze and Broom.

Its usual habitat is a pasture or meadow either in the lowlands or the Highlands. It is also found along every wayside, and carpets the lawn in a garden or the sward in a churchyard. Though it is supposed to be so constant in its characters I have found plants with a scape having spreading hairs, and elsewhere flowers with a very narrow diameter, less than a threepenny piece, whereas they are frequently as large as a sixpence.

FIG. 37.—DAISY. *See page* 134.



(flowers enlarged). *See page* 136.

The roots are fibrous and numerous. The stems are all scapes. The leaves are radical and arranged as a rosette, petiolate, obovate or spathulate, the margin serrate, fleshy, the midrib pronounced. The stem may be a prostrate rhizome, dividing into many branches, when the leaves grow laterally.

The flowers are on long single scapes with the hairs usually appressed. The common simple involucre is membranous at the margin, the yellow disc flowers are funnel-shaped, tubular. The female flowers in the ray are longer than the involucre, tubular below, then flat, white, lanceolate; the oval seeds are flat and have no pappus.

The daisy in flower is 5 to 6 in. in height. It flowers from March to August. The numerous disc florets form a capitulum, which is flat and yellow, the ray florets being longer.

There are no stamens in the ray and no sweeping hairs on the branches of the style. The pistil bears stigmatic papillæ, with close sweeping hairs from the tip to the base, which clear the cylinder of pollen when the style has lengthened. The papillæ are few in the neighbourhood of the hairs on the margin at the widest points. When the plant is pollinated the lobes of the style are bent back. The hive bee and other bees, flies, butterflies and beetles visit the Daisy.

There being no pappus the achenes rely on the flattened ribs for dispersal by the wind.

Bachelor's Buttons, Bairwort, Banwort, Benner Gowan, Bennet, Benwort, Bessy Banwood, Billy

Button, Boneflower, Bonwort, Bruisewort, Cat Posy, Comfrey, He Daisy, She Daisy, are other names.

An old writer says it is called Banwort because "it helpeth bones to knyt agayne."

OXEYE DAISY (*Chrysanthemum leucanthemum*).

This common lovely wild flower is found in every part of the British Isles and ascends to 2100 ft. in Wales.

The Oxeye Daisy is everywhere common in meadows and pastures at low as well as high elevations. A very favourite habitat is a railway bank, where it grows in large patches with Hop Trefoil, Bird's Foot Trefoil and a host of meadow grasses and other plants. Sometimes it is to be found growing amid the corn. Grassy places along the roadside are also beautified by its presence in every district.

The root is fibrous and the stem is to some extent stoloniferous, spreading in this way from a common centre, and thus forms extensive patches wherever it grows. The stem is tall, erect, leafy, and bears a single flower, being striate. The leaves are sessile, alternate, and clasp the stem at the base, being linear, obovate. They bear a few teeth. The root-leaves are stalked, crowded, obovate, serrate, and incised. The stem is usually simple, rarely branched. The large flowers are on long peduncles, and have a large yellow disc with long, white, ray flowers. There is a narrow membranous margin to the phyllaries. The terminal flowers are solitary.

There is no border to the fruit. The achenes are ribbed, and purplish-black.

The Oxeye is often 2 ft. high. It flowers in June and July.

There are 300 to 400 florets, forming the disc, and 20 to 25 florets at the border with abortive stamens and an external white lobe. The yellow disc is surrounded by a broader white ray. The throat of the disc florets is shallow, allowing short-lipped insects to reach the honey. In the first phase the pollen is above the corolla, in the second the stigma. Cross-pollination is effected by insects in crawling over the flower. Thick spreading hairs are borne on the end of the lobes of the style, and as it lengthens sweep the pollen out of the cylinder. Two broad rows of papillæ are borne on the inner surface of each lobe, with a narrow space between, which extends over the outer edges, regularly dusted with pollen, when it is accumulated above the cylinder by the projecting style, and not carried away by insects.

In the absence of insects the flower is self-pollinated. Bees, flies, butterflies and beetles are the chief visitors.

The achenes being light and compressed are adapted to dispersal by the wind.

The Oxeye is also called Cow's Eyes, Big Daisy, Bull Daisy, Butter Daisy, Devil's Woe, Dun or Dunder, Field Daisy, etc.

GROUNDSEL (*Senecio vulgaris*).

Everyone knows Groundsel. Even the poor hawker who keeps a few birds in a cage is familiar with it as green food for his pets, and the gardener finds it a constant pest in the garden. It is in fact found in every part of these islands, and in Northumberland grows at a height of 1000 feet.

Groundsel grows as a rule on cultivated land where the earth is loose and broken and seldom in fields or pastures where grass is the dominant feature. It is thus found regularly in gardens, allotments, arable land, waste ground, farmyards, stackyards, along the highway where the earth is often broken up by the road-scraper, and about common waste land where the ground is loose and sandy, as well as by the sea coast.

It has a root with numerous fibres, and a centra erect stem, branching above. The habit is compact and bushy. The stem is smooth or downy, and there are numerous varieties. The leaves vary considerably, being pinnatifid, with square-cut segments, the lobes deep, as are the teeth, and they clasp the stem, or are stalked, especially the lower leaves.

The heads are small, in dense racemes, yellow, in an involucre with small scales, the outer bracts being dark, very short, subulate, ovate. There are no ray flowers.

Groundsel is 1 ft. in height as a rule. It flowers all the year round.

B. Hanley. FIG. 39.—GROUNDSEL. *See page* 138.

A. R. Horwood. FIG. 40.—STINKING MAYWEED. *See page* 139.

The capitulum includes sixty to eighty florets with a fairly long tube and short throat, so that honey is easily accessible.

As the flower is not conspicuous it is not visited by many insects except flies. Therefore it is usually self-pollinated.

Hairs at the tip of the style sweep the pollen out, and it remains partly on the edge of the stigmas, partly falling on the under surface when they separate.

The achenes being provided with pappus are blown away in parachute fashion by the wind.

Groundsel is called also Birdseed, Chickenweed, Grinning Swallow, Grinsel, Grunsel, Grundsel, Simson, Swichen.

In the Highlands it was employed by the Scotch in former days as a remedy for the Evil Eye. And in equally superstitious days it was regarded as an effective cure for ague. So valuable was it considered that in the fifteenth century it was cultivated. Grinning Swallow is a corruption for Groundsel in Scotland.

STINKING MAYWEED (*Anthemis cotula*).

This common plant, so much associated with cultivated land, is found in most parts of the country suited for agricultural operations, but is absent apparently from some parts of Wales, and the hilly tracts of Scotland also, which are in the main given up to heaths and moors. In the north of England, however, it is rarer than in some parts of Great

Britain beyond the border. It is hardly a native plant and best regarded as a colonist.

This being so we shall expect to find it in cornfields or upon their borders, on roadsides about gateways, or the open ground formed by stone heaps used for macadam. Gardens, waste places, and similar ground around houses or in villages are other suitable habitats.

Two or three plants grow together. The stem is erect with ascending branches. The sessile leaves are alternate, pinnatifid, with linear, subulate segments, glabrous and dark green.

The flowers of the disc are yellow, the ray flowers white. The receptacle is conical. The setaceous phyllaries are shorter than the flat disc florets. There is no pappus. The fruit is strongly ribbed on the back.

The Stinking Mayweed is 1 ft. in height. It is in flower from June to September. The white ray florets are neuter, the flat disc flowers bisexual, and the tube is fringed with five teeth. The scent of the flowers is strong and disagreeable, hence the English name, and this forms a distinction between this plant and the Scentless Mayweed, which has a larger flower and a generally darker green colour.

As the flowers are conspicuous they are often cross-pollinated, though as a corn plant insect visitors are not so frequent as in the case of plants that grow in the open.

As the fruit is winged it is adapted to dispersal by the wind.

Stinking Mayweed is also called Balder's Brae, Baldeyetrow, Camomile, Dog's or Stinking Camovyne, Dog Daisy, Horse Daisy, Dog Banner, Dog Binder, Dog Fennel, Hog's Fennel, Jayweed, Madder, Madenwede, Maise, Mayweed, Poison Daisy.

Baldur says, "So fair and dazzling is he in form and features that rays of light seem to issue from him. I tell thee that the whitest of all plants is called Baldur's Brow."

It was used formerly for hysteria, hæmorrhage, rheumatism.

BURDOCK (*Arctium minus*).

Well known to everyone conversant with highways in the country from the tenacity with which its prickly burs stick to one's clothing in winter, Burdock is found generally through the British Isles, but is absent from several counties in different parts, ranging, however, as far north as Skye.

Commonly found on waste and cultivated ground, especially on the borders of the latter, it is found also in fields and meadows, and in woods and plantations.

As a sturdy plant it can compete successfully with most plants, and thus survives in spite of the liability of eradication owing to the great space it occupies, starving out all the less aggressive species around it.

It is a tall, erect plant with a much-branched stem above. The leaves are cordate, sinuous, the root

leaves being coarsely toothed. The petioles are concave, subangular, and furrowed.

The flowers are in raceme-like heads and borne on stout peduncles, the bracts slender, the phyllaries not so long as the flowers, which are purple and enclosed by the long hooked scales.

Burdock grows to a height of 3 to 4 ft. It flowers in July and August.

The corolla is fairly wide and has erect triangular teeth.

Honey fills the tube half way. Stigmatic papillæ cover the inner surface of the branches of the style, the outer surface being violet and covered with short sharp hairs directed obliquely upwards. Where the style divides the hairs are continuous for a short distance, terminating in a tuft of long hairs. The style projects below the ring of longer hairs, the stigmatic lobes being widely separated. There is little opportunity, therefore, for the flower to be self-pollinated. Bumble bees, etc., visit it.

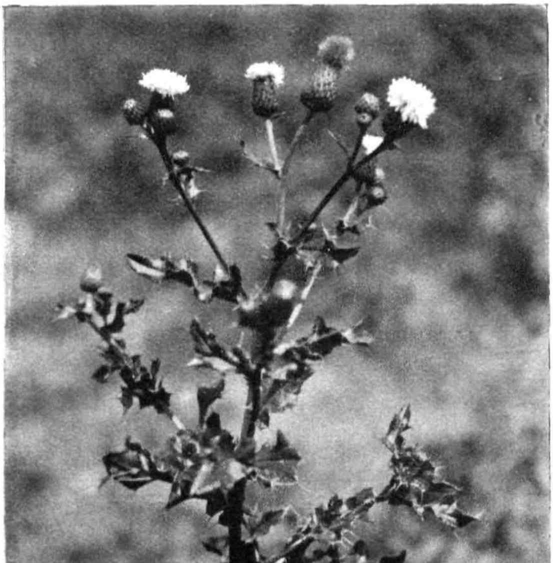
The seeds are provided with pappus and can be dispersed by the wind, and the long hooks of the seed-head catch in the hair of animals and are distributed also by their agency.

There are no other common names for Burdock. Formerly it was used as a remedy for rheumatism.

Creeping Thistle (*Cnicus arvensis*).

To the farmer this common pest of fields, meadow or pasture, or of the cornfield, is well known as one

B. Hanley. FIG. .—BURDOCK. *See page* 141.



B. Hanley. FIG. 42.—CREEPING THISTLE. *See page* 142.

of the most difficult weeds to eradicate. It is found in every part of the British Isles and at high altitudes.

The Creeping Thistle is found with the common welted thistle, Spear Thistle and others, in fields and meadows, where it forms an extensive patch, its diœcious male and female flowers in different patches, to the exclusion of grasses and other plants. Its overblown flowerheads scattered up and down on hilly tracts are a familiar sight in summer and autumn, the down floating away freely in the breeze, spreading the plant far and wide.

It also grows freely in cornfields when the ground is dirty and not well cleaned. By the wayside it is frequent, and it is common on waste ground, and, indeed, wherever crops are gathered, as the ripe seed falls here and there during carriage of hay or corn to the stackyard.

The root is very long, a typical taproot which becomes ultimately creeping and dividing. The stem is erect and flexuous, angular, furrowed, usually cottony.

The leaves are pinnatifid, spinose, those above half clasping, the lower on stalks, oblong lanceolate, sinuate or lobed. The stem is not winged as in the welted thistle.

The flower heads are in corymbs, on short peduncles, with numerous heads, the involucre of the male inflorescences being subglobose, that of the female ovoid, the colour pale purple or white. The

bracts are appressed, ciliate, the tips rigid and spinose, the outer having spreading spines, the inner obtuse, acuminate.

The fruit is smooth and shining. The pappus is dirty white.

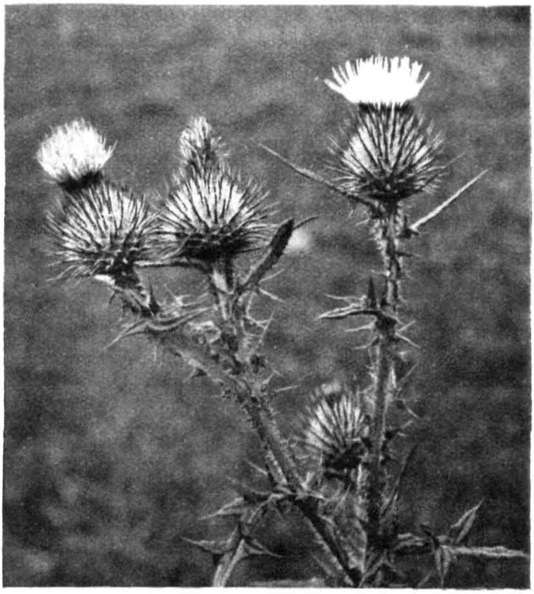
There are a hundred florets in each head. The tube is long, campanulate above, the five diverging lobes being linear. The florets at the side turn outwards. They form a flowerhead of some width, rendering the plant conspicuous, the honey rising high in the tube. Short-lipped insects can easily reach it. As many as eighty-eight species were noticed by Muller.

The seed, being provided with a pappus, is blown away by the wind in parachute fashion.

SPEAR THISTLE (*Cnicus lanceolatus*).

This handsome thistle with its lanceolate, spear-like leaves is a universal plant in Great Britain.

Though it grows commonly in fields, meadow and pasture, it is also found on cultivated land, in corn-fields and where plants are carried by farming operations from the field to the farmyard, stackyard, or the neighbourhood of houses, by the wayside, where standing alone it is a stately and handsome plant. The well-marked root-leaves may be detected in spring spreading in a stellate manner upon some hedgebank, where it vies with Nipplewort, the Teasel, and the hedgerow umbellifers such as Hogweed for pride of place.



B. Hanley. FIG. 43.—SPEAR THISTLE. *See page* 144.

B. Hanley. FIG. 44.—DANDELION (in flower). *See page* 146.

The root is long and deep-rooting. The stem is thick, tall, erect, simple, with large, decurrent, hispid, pinnatifid leaves, which are spinous and hairy above, the segments bilobed, spreading, armed with spines, white and cottony underneath. The segments end in long spines.

The handsome flowerhead is purple, large, with a powdery whitish pollen often lying on the surface. The ovate involucre is tomentose, the phyllaries spreading, lanceolate. The heads are few, in fascicles, erect. The involucral bracts are numerous, subulate, and there is a strong midrib and long spines.

Spear Thistle is often 3 to 4 ft. high. It flowers from June to September.

The flowers are as in the Creeping Thistle but the honey is not so easily reached. The florets have narrow tubes; the throat in which the honey collects is rather long.

Only long-tongued humble bees can reach the honey, and Honey Bees, flies, and some butterflies.

The achenes are provided with a feathery pappus and are adapted to dispersal by the wind.

Spear Thistle is also called Bow Thistle, Bur, Cheese, Dashel, Marian, Quat Vessel, Thistle, Bank, Bellm Bird, Blue, Boar, Buck, Bull, Bur, Hors, Scotch Thistle. It is called Bow Thistle because goldfinches feed on it, hanging on below the head to peck at the seeds, bowing the head down. The name Boar Thistle refers to the prickly spines. Children are in the habit of blowing the pappus and saying:

"Marian, Marian, what's the time of day,
One o'clock, two o'clock, it's time we were away."

It is the Thistle which is the emblem of Scotland, as the Rose is of England, the Leek of Wales, Shamrock of Ireland.

DANDELION (*Taraxacum officinale*).

The name Dandelion is derived from the French dent-de-lion, and the former generic name Leontodon is a variation of this, lion's tooth, in allusion to the form of the leaf segments, which have a very characteristic shape.

The Latin name (first) refers to its effects as a medicine (tarasso, disturb). It has been used as a good spinach in the spring, and is still a pot-herb in the garden.

So common a plant as Dandelion needs little description, for it is known by all.

The Dandelion is universal. It, however, prefers apparently open ground, such as cultivated land, being a succulent plant, with a thick milky tap root, and is most luxuriant in gardens and where grass does not compete with it. But it is also a feature of our meadows in spring and summer, making them golden with its large and profuse bloom. It is very variable. Smaller forms grow on dry and wet soil respectively.

The stems are all scapes, bearing flowers. The leaves are radical, and the plant has the rosette

S. Crook. FIG. 45.—DANDELION (in fruit). *See page* 146.

B. Hanley. FIG. 46.—NETTLE-LEAVED BELL-FLOWER. *See page* 149.

habit. They are oblong, obovate, glabrous, runcinate, toothed, dark green, with a distinct midrib, and the leaf-segments are recurved.

The flower heads are large and yellow, and broad, borne on hollow milky scapes, usually glabrous, and single. The outer phyllaries are reflexed, usually in some forms erect or imbricate.

The head is globular. The downy pappus is stalked, the receptacle convex, punctate. The sulcate achenes are incurved.

The Dandelion is about 8 in. in height. Though perennial, it flowers from March or April to October.

In the capitulum there are 100 to 200 florets, and it is very conspicuous. There is abundant honey, which rises high up in the tube. In the sun the flowers expand widely, but close up at night and when it is wet. In the absence of insects the flower is self-pollinated. There are 24,000 grains of pollen in each flower-head. The style nearly fills the tube. Short-lipped insects can reach the honey. The cylinder is exserted from the tube. The style is covered with pointed hairs often covered in pollen, which is swept out of the cylinder. The lobes of the stigma are covered with papillæ and are reflexed, and make 1½ spiral turns. As it flowers very early and late in the year, the power of self-pollination is an advantage. The honey bee and numerous others, flies, butterflies and beetles visit it.

The seeds, being provided with a pappus, are blown

to a distance by the wind, the familiar "clocks" forming a typical parachute apparatus for the purpose.

THE BLUEBELL GROUP.

There is no flower perhaps more popular than the Bluebell (the hair or hare bell, in England). Of this order, the Campanulaceæ, there are about 1000 species, which are chiefly found in the temperate regions, and the Mediterranean region, or subtropical regions.

Most of them are herbaceous perennials, but a few are trees or shrubs.

The leaves are alternate, with no stipules, with latex. The stem is generally erect, bearing terminal or axillary flowers, usually racemose or cymose.

The flowers are hermaphrodite, regular, or ligulate, with five divisions in the calyx seated on the ovary, and persistent till the fruit is ripe. The corolla is five-lobed and monopetalous, and withers when the fruit is ripe. The stamens are five and alternate with the corolla lobes. The anthers are sometimes united as in Jasione, and open inwards.

The fruit is a capsule, dry and dehiscent, opening by means of valves laterally or at the top, and is crowned with the withered calyx and corolla.

The anthers ripen first. There is honey at the base of the style. The triangular bases of the stamens cover it and are close together so that a long proboscis is needed to reach down to it. The flowers,

being conspicuous and pendulous, are adapted to insect pollination, especially by bees.

The anthers shed pollen on the style and the stigmas are closed, a fringe of hairs upon the style catching the pollen as it falls upon them. Then the stigmas open, and in curling open touch the hairs laden with pollen, so that the flower is also self-pollinated.

The Campanulaceæ often have a bitter acrid juice, frequently milky. Many of the Campanulas are well known in the flower garden. Their flowers are usually white or blue, and large and handsome. The roots of Rampion were formerly much eaten.

The order includes Campanula with a pendulous corolla, with a capsule two to five-celled and opening by lateral pores, occasionally at the top; Phyteuma with a rotate corolla, with capsule two- to three-celled, opening at the side; Jasione with a rotate corolla, capsule two-celled, opening above, and flowers in heads. In Wahlenbergia the capsule is loculicidal; in Specularia the capsule dehisces at the side and the corolla is rotate or campanulate, the ovary long and narrow.

NETTLE-LEAVED BELL-FLOWER (*Campanula Trachelium*).

The Bell-flower group, as the name implies, is distinguished by the bell-like or campanulate corolla, which is usually drooping, but sometimes suberect.

This contrivance is admirably adapted to the needs of pollination, allowing insects to enter the mouth to get at the honey, and effectively sheltering it from the rain.

There need be no fear of mistaking this bell-flower for the common harebell; the leaves are so different, apart from other distinctions. In this plant they are like those of the nettle, and are doubly serrate, whereas in the large common bellflower, *C. latifolia*, they are simply serrate, and all the leaves have stalks in this form whilst only the lower are petiolate in the latter.

The plant grows in woods and copses, loving the shade, under hawthorns, etc., usually on a dry sandy or gravelly soil.

The stem is tall and erect, usually 1 to 3 ft. in height, and is hispid with the hairs reversed and angled. The leaves are all petiolate ovate-lanceolate, doubly serrate, the base broad, the serrations coarse and irregular.

The root leaves are cordate and borne on long stalks, the stem leaves have a broad base and are narrowed at the tip, acute. The bracts are leafy.

The flowers are large, bell-shaped, drooping, or erect, bluish-purple.

There may be one or two or three in a cluster, and they are borne in racemes and panicles. The peduncles are short. The bracteoles are lanceolate. The calyx is hispid, short and broad, with ovate, lanceolate segments. The corolla is a broad bell,

with acute half-erect segments. The capsule is drooping and short, opening by basal valves.

Honey is secreted at the bottom of the wide bell, and the flowers attract many insects. The anthers do not form a column; the filaments form triangular valves below, protecting the honey.

The stigma is lobed above. The stamens at first are no longer than the pistil, then open inwards, and the pollen sticks to the style, insects brushing it off. Then the style gets longer and the lobes diverge, so that fresh pollen from another flower is transferred to it by insect-visitors and cross-pollination is thus effected. As in its inverted position the stigma is turned down pollen does not fall on it automatically, so insects must bear it.

THE HEATH GROUP.

The different kinds of heaths, though liable to confusion amongst themselves, are, as a group, the Order Ericaceæ, easily recognised. In the first place, they have a marked habit, which is very characteristic, having wiry, suberect, stems, with filiform leaves, adapted to dry conditions. They grow in associations giving a character to the physiognomy of the vegetation. The pink pendulous bells, especially Crimson Heather, make the hills in August almost aglow with colour.

There are about 1350 species which are found in all parts of the world, except in hot and desert regions.

They grow on arctic moorlands and bogs in high-

flowers, revolute and downy above, and on the midrib below, and as the English name implies, placed crosswise.

The flowers are rose-colour, terminal, in umbels, secund, and drooping. The small flowers are ovate, and the style is not exserted. The flowers grow on short pedicels.

The downy ovary is tipped with glandular hairs. The stem is glandular.

It may grow to a height of 1 ft. The flowers of this evergreen shrub are in bloom from June till August.

The campanulate flower is drooping, the pistil and stigma nearly filling the mouth, acting like a clapper to the bell. The tube is narrow in the middle. At the base of the ovary is a dark glandular honey-ring, and the central style fills the mouth, the black, moist, sticky stigma, slightly protruding, being touched by an insect clinging on to the flower, which receives the sticky secretion. The eight anthers surround the style rising above the stigma, two long acute processes touching the sides of the corolla, as spokes of a wheel. An insect touching the stigma touches them with its proboscis. In the absence of insects the flower can thus be self-pollinated as pollen falls on the edge of the stigma. Bees and flies visit the flower.

The capsule splits open from above and the seeds fall beneath, or, being light, are blown away by the wind.

C. A. Allen. FIG. 47.—CROSS-LEAVED HEATH. *See page* 153.

A. R. Horwood. FIG. 48.—ASH. *See page* 156.

Cross-leaved Heath is called Bell Heath, Bell Heather, Broom Heath, Cat Heather, Crowling, Grig, Hather, Heath, Bell Besom, Broom, Father of Small Heath, Heather Bell, Carlin, Ringe Heath, Honey Bottle, Ling, Crow Ling. Ringes or whisks made of heath were made of it. It was used on the eve of All Saints' Day to burn as a bonfire.

THE ASH GROUP.

The order Oleaceæ consists of shrubs and trees, of which there are nearly four hundred species, which are found in warm, temperate, and tropical regions. The East Indies is a specially favourable region for their development.

Two groups have been made to include the different genera. Oleoideæ include Ash, Forsythia, Syringa (Lilac), Phillyrea, Olea (Olive) Privet, in which the seeds are pendulous, and the fruit is not constricted, whilst in Jasminoideæ the seeds are usually erect, and the fruit is constricted laterally.

Amongst British plants are the Ash and Privet, the one a tree, the other a shrub.

The Ash is used for a variety of purposes, being strong and flexible, so that it is used for the handles of tools and implements, for hurdles, fences, etc. It is, moreover, often planted for its natural beauty in parks, being abundant at Melrose and Netley Abbey. In a wild state it forms woods on a limestone soil. The Privet is an ornamental shrub much planted, and the berries yield a rose dye and an oil used in

Germany for cooking. An astringent juice obtained from the Ash has been used medicinally.

In the Oleaceæ the branches are usually opposite, the buds scaly and terminal.

In the Ash there are nine to fifteen leaflets, subsessile, lanceolate, and opposite in each leaf.

The leaves are simple or pinnate, with a terminal leaflet, and without stipules. Accessory leaf-buds appear in the axils of the leaves in Lilac. The flowers are in racemes or cymes, and in the Ash have no perianth; the flowers hermaphrodite or unisexual, regular, with two to six divisions, polypetalous or apetalous in Ash. The calyx, when present, is 4-fid and persistent. The corolla is regular, falling, 4-partite, valvate, or absent. There are two stamens. In the Ash there may be pistil and stamens, pistil only, stamens only. There is no disc. The style is simple; the calyx two-lobed. The fruit is a berry, drupe, capsule, or schizocarp, with one to four seeds, or only one.

In addition to Ash and Privet, the Olive, *Olea Europæa*, yields useful oil, and another scents China tea. Manna is obtained from the Ash in Sicily. Forsythia and Lilac, also Jasmine, are well-known garden shrubs.

ASH (*Fraxinus excelsior*).

Like the other common trees, the Ash is more or less universal, though not really native wherever it is found, since so much planting has been done.

The enclosure of lands, and hedging and making of roads has had the effect of causing the Ash to be commonly planted in hedgerows and along the road. Plantations of Ash saplings are of frequent occurrence also, the poles being used for fencing and other purposes; but in some districts it is truly indigenous, growing in woods and copses with a typical ground flora.

The Ash is a tall, erect tree, with ashen bark, rimose on the trunk, smooth on the younger branches. The habit is typical, being at first drooping, then ascending in the form of the letter ∽, or sigmoid. The leaves are pinnate, there being four to eight leaflets, the terminal one being longest, ovate and entire, and sub-sessile.

The buds are black, flat, and the twigs are flat.

The flowers are green, then purple, there being no calyx or corolla, only stamens and pistil. The flowers are terminal, imbricate in bud, then spreading. The fruit is in the form of "keys" or lanceolate capsules.

The Ash is, when well grown, 80 ft. high. The flowers appear in April and May.

The flowers, as in other trees, appear before the leaves. There being no perianth, they are not rendered conspicuous. They are, in short, crowded racemes. Some flowers are hermaphrodite, consisting of two stamens and two carpels at right-angles. The Ash is polygamous, and there are different combinations of male, female, or hermaphrodite flowers on the same tree or different individuals.

Like other trees, it is pollinated by the wind, the pollen being blown upward, the male flowers being below the female.

The seed is winged at the tip, and is adapted to dispersal by aid of the wind.

The first Latin name refers to its habit of splitting, and for this reason it is used largely for making fences in fields.

Ache, Aischen, Aishen Tree, Ash-candles, Cats and Keys, Cats' Keys, Chats, Culver Keys, Eisch Keys, Esh, Freyn, Ground Ash, Haish, Hertwort, Ketty Keys, Keys, Kite Keys, Locks and Keys, Patty Keys, Peter Keys, Shacklers, Urchin Wood, Croney are names it has also received.

Shacklers refers to the rattling of the keys or fruits.

Esh means to flog, the twig of an ash being used for the purpose.

It was thought to be the Igdrasil, or Tree of Life.

THE PRIMROSE GROUP.

In the Order Primulaceæ are included two at least of the most popular British wild flowers, the Primrose and the Cowslip, which are always to be associated with spring and the renewal of plant activity.

There are more than three hundred species which are natives of the northern temperate region. Some are found upon the summits of alpine mountains,

where with Saxifrages and other alpine plants they help to add lustre to that wonderful alpine vegetation which forms such an interesting feature of the plant life of high altitudes.

They are herbaceous plants with radical leaves as a rule, and the rosette habit. And the stem is usually a flowering scape.

They are divided into two groups according as the flowers are regular and the calyx not spiny, as in all but Coris, or medially zygomorphic and with a spiny calyx. The first includes plants with the limb of the corolla never bent back on the tube, such as Primrose, Androsace, Soldanella and Water Violet, in which the ovary is superior, and Brookweed, in which it is half inferior, Yellow Loosestrife, Steironema, Trientalis, Glaux, Pimpernel, Centunculus, and Cyclamen and Dodecatheon in which the limb of the corolla is bent back.

Amongst this group are many of our most highly prized garden flowers. Such are the Primula, of which numerous varieties, including the Auricula, are known, Androsace, Soldanella, and the lovely Cyclamen.

The majority of the Primulaceæ have rhizomes or tubers, and all are herbaceous perennials. The leaves, mainly radical, are opposite or alternate, without any stipules.

The flowers are borne on terminal scapes when many-flowered; the calyx is tubular 4 to 7-fid, persistent, and except in Samolus, inferior. The corolla is

regular with a similar number of lobes, but in Glaux is absent. The lobes of the limb of the corolla alternate with those of the calyx. Opposite the corolla lobes the stamens are inserted upon the corolla tube. There may be five staminodes which alternate with the petals. The ovary contains many ovules and is one-celled. The stigma is capitate. There is a single style, which may be long, short, or intermediate in length. The fruit is a capsule dehiscing by teeth, and may contain few or many seeds.

Great Yellow Loosestrife (*Lysimachia vulgaris*).

This handsome plant, which often finds its way into the garden, is found in most parts of the British Isles, though it is nowhere common, and is rare in Scotland, local in Ireland.

Unlike its near allies, the Wood Loosestrife and Creeping Jenny, it is not usually found in woods, but is found generally in wet places, by riversides and other similar tracts ; but drainage has affected its distribution like many other plants.

It is tall, erect, branched, shrub-like in habit, forming a clump, and altogether a conspicuous plant. The leaves are opposite, in threes and fours, oblong, lanceolate, sessile, entire, glabrous. When the leaves are in pairs the stem is quadrangular ; when there are three leaves it is grooved and angular.

J. H. Crabtree. FIG. 49.—GREAT YELLOW LOOSESTRIFE. *See page* 160.

C. Mosley. FIG. 50.—PRIMROSES. *See page* 162.

The flowers are large, yellow, terminal and axillary, in panicles more or less compound. The sepals are striate, reddish, five, the tips becoming twisted before and after flowering. The corolla is rotate, the limb divided into five segments.

The Great Yellow Loosestrife is 3 ft. in height. Flowers are to be found between July and September.

The flowers are trimorphic, two extreme forms being connected by transitional forms. The most conspicuous form is not self-pollinated. There is no honey.

The petals are red at the base in the dark-yellow conspicuous form, and are widely expanded, the filaments red at the tip. The style outreaches the anthers. Cross-pollination follows insect visits. In the second form the petals are light yellow, not so spreading, and are directed obliquely upwards. The filaments are greenish-yellow. The style is equal in length to the two lower stamens. Self-pollination in this form occurs if insects do not visit it. In the third form the filaments may be red or large, or both, or the corolla may be red at the base or extending beyond the longer stamens. Bees and flies chiefly visit it.

The capsule contains many seeds, and is five-valved, the seeds being shaken out by the wind.

It is called Golden Loosestrife, Herb Willow, Willow Herb, Golden Willow Herb, Yellow Willow Herb, Willow-wort, Yellow Rocket.

It is cultivated, and often found in the garden.

Gerard says: "It tooke his name of a special vertue that it hath in appeasing the strife and unrulinesse which falleth out among oxen at the plough, if it be put about among their yokes, but it rather retaineth and keepeth the name Lysimachia of King Lysimachus the son of Agathodes, the first finder out of the nature and vertues of this herbe, as Plinie saith."

PRIMROSE (*Primula vulgaris*).

Associated with poetry and recently with the name of Lord Beaconsfield the Primrose is endeared to everyone, not for these reasons alone, but because it is one of the earliest spring flowers, and breathes of the woods and dells where it is so commonly found. But its popularity, sad to say, is likely to endanger its well-being in many a district, where it is now scarce, hawkers and others thinking nothing of rooting it up and hawking it for sale in the streets, in the same way as bluebells, orchids, and ferns. It is to be hoped this practice will soon be prevented by a wise endeavour to preserve our native wild flowers.

It is found in every county except Peebles, and in Yorkshire grows at an altitude of 1600 ft.

Its favourite habitat is a wood, where it grows in clumps, studding the ground under trees. It is also found in some districts along the hedgerow, in open fields and upon banks, especially railway banks.

The roots are fibrous, numerous and white. The

aërial stems are all flowering scapes. The leaves are radical with a reddish petiole, the leaves having a decurrent margin, oblong, obovate, or ovate toothed, wrinkled, downy beneath, tapered below, the margin revolute, undulate. The midrib is hollow above, keeled below.

The flowers are pale yellow, single, erect. The tubular calyx is angular, the teeth subulate, incurved above. The corolla is tubular. The styles vary in length.

The Primrose in flower is 6 in. in height. The flowers bloom from March to May.

The flowers are dimorphic, there being a long-styled and a short-styled form. The stamens are united to the corolla above the stigma in the short-styled form. The pistil is longer than the stamens, and is as long as the tube in the long-styled form, the stamens being half-way down, the stigma dilated, filling the mouth of the corolla, whilst in the short-styled form the stigma is half-way down the tube. An insect visiting a long-styled form is covered with pollen at half the distance of the tube, whilst in the short-styled form it becomes dusted just opposite the entrance.

The two forms are found on different plants, there being about an equal number of each, the long-styled being pollinated with pollen from the short-styled forms owing to the above arrangement. In the former the stigma is rough and globular, depressed in the latter, and in the long-styled forms the pollen is smaller.

The capsule contains many seeds and is five valved, the seeds being shaken out by the wind.

It is also called Beef and Greens, Butter Rose, Jack-in-Box, Jack-in-the-Green, King-Charles-in-the-Oak, Lady's Frills, Milk Maid.

The Gentian Group.

In the Order Gentianaceæ are included some of our most cherished wild flowers. The discovery, for instance, of a Wild Gentian marks a red letter day in the annals of the botanist.

Gentians are arranged in two groups, the first with leaves opposite, and the corolla convolute or imbricate, including Exacum, having an ovary with two loculi, Erythræa, Chlora, in which the ovary has one loculus and a projecting placenta, Gentiana and Swertia, the same, with the placenta not projecting, and Menyanthes and Limnanthemum in which the leaves are alternate, the corolla induplicate, valvate.

There are about a hundred and fifty species, which are found in every part of the world, often at great altitudes, as at 16,000 ft. in the Himalayas. They are abundant in the Alps.

The European forms of the Gentian are blue, those of New Zealand red, as also in South America.

They have bitter properties, and the roots are used medicinally, being employed as tonics.

The Bog Bean is used in some districts for rheumatism.

The order includes not only arctic and alpine plants,

but maritime species such as Centaury, and marsh plants such as Bog Bean.

Most of them are herbaceous perennials. A few are shrubs. Many of them are found in the flower-garden, such as the Gentians, *Gentiana verna* being a great favourite.

The majority that are perennial are provided with a rhizome. The habit is erect, with terminal flowers, except in Bog Bean and Limnanthemum, the last being aquatic, and similar to the water lily in habit.

The leaves, which are opposite, are usually entire, with no stipules. In Bog Bean they are trifoliate.

The flowers are in cymes similar to that of Caryophyllaceæ. The calyx is four- to eight-lobed, and persistent and imbricate. The flower is regular. The corolla is campanulate or funnel-shaped, sometimes salver-shaped and convolute, tubular, with as many lobes as the calyx, imbricate and twisted, fringed at the mouth. The stamens alternate with the corolla lobes and are of the same number, inserted on the corolla. The anthers open inwards and are versatile, opening outwards ultimately. The ovary is made up of two carpels, with a glandular disc below. The style is simple, the stigma also simple or bilobed. The fruit is a capsule or berry, with small seeds.

Bog Bean (*Menyanthes trifoliata*).

Though a marsh or bog plant, Buck or Bog Bean is not found in Huntingdonshire, once part of the

Fens, but as it was used largely for rheumatism it may have occurred there, and become extinct since, as it has in other places from the same reason. Drainage also has caused its disappearance in other parts. In the Lake District it is found at an altitude of 1800 ft.

Its chief habitat is a bog, where there is a layer of peat and moist conditions. It is also found in damp places at the sides of pools, in wet meadows by the banks of streams, as well as in true bogs.

The stem is decumbent, the root adventitious. The stem is a flowering stem. The leaves are stalked, and bear three sessile, ovate leaflets which are sinuous with a smooth margin. It is trifoliate. The petioles are sheathed at the base, terete or round and striate.

The flowers are pink in bud, and become white later, the feathery corolla giving them this appearance. The scapes are simple, leafless, erect or decumbent, ascending, longer than the leaves. The terminal flowers have broad, obtuse bracts and are racemose, originating opposite a leaf from the sheathing leaf-bases.

The calyx is tubular, the sepals obtuse. The corolla is funnel-shaped and filiform. Bog Bean is about a foot in height. It flowers in July, but the plant does not always flower.

It is dimorphic, having long- and short-styled forms. Fruit is seldom matured. The corolla is half campanulate, half funnel-shaped. The tube is thick and grooved. It is protected from flies by being reflexed and bearded within. The stamens are situated on

B. Hanley. FIG. 51.—BOG BEAN. *See page* 163.

B. Hanley. FIG. 52.—SELFHEAL. *See page* 169.

the tube and tapered. The anthers are purple and sagittate. The style, clavate above, is twice as long as the stamens. The stigma is divided into two lobes, villous and green.

The capsule, which is a schizocarp, contains numerous seeds, which are scattered by the wind.

The name Buckbean is derived from the Dutch Buckerbeane. It is also known as Bean Trefoil, Beckbean, Boghop, Bogmit, Brookbean, Marsh Claver, Marsh Cleever, Marsh Clover, Doudlar, Threlfold, Bog Trefold, Marsh Trefoil, Water Trefoil. The name Trefoil alludes to the trifoliate leaf. It was used as a tonic and for fever, and in place of hops for dropsy.

The Dead Nettle Group.

The order Labiatæ is at once recognised by the labiate or lip-like character of the corolla, which is irregular and unsymmetrical. There are about 2800 species, which are found in all parts of the world, but more particularly in the Mediterranean region.

Most of them are land plants, a few growing in water at the margins of rivers or ponds. Several are shrubs or undershrubs. The habit is usually that of an erect plant with terminal flowers (or in whorls) with opposite leaves or sub-pyramidal.

They are sub-divided into a number of groups, depending upon the character of the nutlets.

In this order are included Bugle, Wood Sage,

Skull Cap, Horehound, Ground Ivy, Self-heal, Hemp Nettle, Dead Nettle, Black Horehound, Woundwort, Clary, Calamint, Marjoram, Thyme, Mint.

Volatile oils are yielded by Lavender, Rosemary and others. The Labiatæ, as a whole, are stimulating, fragrant and aromatic.

Condiments are made from Thyme, Marjoram, Clary. Peppermint is used as a medicine. Savory, Sage, Basil, Spearmint are pot-herbs. Horehound is used as a beverage, and Ground Ivy for flavouring ale.

A characteristic feature of the order is the square stem, which is usually erect, though in a few—*e. g.* Bugle—it is at first creeping. The leaves are opposite or in whorls.

They are decussate, simple, with no stipules, and downy in a large number of cases, the glands of the epidermis being rich in oils.

The flowers are either solitary or in axillary cymes, and irregular. Bracts occur opposite the flower. The calyx is tubular, and may be two-lipped or quite regular, with five lobes, persistent. The corolla is irregular, with two lips, the lower one, which is larger, whilst the upper is usually hooded, serving as a protection to the pollen from the rain. The upper lip consists of two petals united together, which are opposite the three united sepals of the bilabiate calyx. The two united sepals are opposite the three united petals of the corolla. The lower lip is three-lobed and larger. There are as many lobes in the calyx as in the corolla. The anthers are four

in number, two of which are longer than the others. They open inwards, and two may be absent. The ovary is situated on a honey disc, and contains two carpels. There is a single style, and the stigma is two-cleft. The fruit consists of four achenes or nutlets, or a drupe.

SELFHEAL (*Prunella vulgaris*).

This pretty wild-flower is very common, being found in every part of the British Isles, ascending to 2400 ft. in Yorkshire.

It is a typical meadow plant, growing in fields, where it may be found with Cowslip, Green-winged Orchis, Sorrel, Adder's Tongue, Moonwort, Bugle (with which it is often confounded), the meadow Crowfoots, Common Meadow Rush, Vernal Grass, etc. It is indifferent as to whether the field is a meadow or pasture. As it is rather fond of moist situations, it is often to be found also in woods and copses, and on the turfy surface of a lawn.

The stem is erect or creeping, with whitish fibrous roots. Several glabrous or hairy stems may spread out from a common centre near the base. The leaves are stalked, oblong, ovate, the upper sessile, serrate, and very rarely pinnatifid.

The purple flowers are whorled, with a pair of truncate leaves below each whorl. The bracts are cordate, ciliate. The calyx-teeth are truncate, lanceolate, mucronate, and the calyx spreading, red or purple. The nutlets are oblong and smooth.

Selfheal may be as much as 1 ft. in height. The flowers may be found from July till September.

The male flowers are large, the female smaller and not so common. In the absence of insect visits the flower is self-pollinated. The stamens are rudimentary in the small flowers; the style projects beyond the upper lip of the tube. The two stigmas are divergent, and have a papillose surface, the inner side being coated with pollen. Insects are frequent visitors, the flowers being conspicuous. In the male large flower the tube is longer, and the stamens are long and bifid above, one shorter lobe being turned outwards, the pointed end resting upon the concave surface of the upper lip. The anthers surround the stigmas and may be brushed by a bee.

The short stamens divide into two branches. The bee's back is brushed by the papillose stigma and by fresh pollen afterwards.

Hive bees and other bees and butterflies visit it.

The nutlets drop out when ripe, being partly assisted by the wind.

Beef and Greens, Butter Rose, Jack-in-Box, Jack-in-the-Green, King-Charles-in-the-Oak, Lady's Frills, Milkmaid, Petty Mullein, Oxlip, Primrose, Plum-rocks, Primet, Prumarde, St. Peter's Wort, Spink, May Spink, Spring Flower, Summerlocks, are names by which Selfheal it also known.

Brunel is a corruption of Brunella, from "die braune," an infirmity amongst soldiers "that lie in campe."

WOUNDWORT (*Stachys sylvatica*).

This is perhaps one of the commonest plants in the British Flora, occuring in 108 out of 112 vice-counties.

Every hedge-bottom is lined with this sturdy plant, which ousts all the weaklings in its way, and works its way to the light from the hedge bottom till it towers well above the ditch-bank.

Not only is it common by the wayside, but also in fields, in meadow and pasture alike, usually in a hedge, or ditch-bottom. It is also frequently found in woods and plantations, here again succeeding in the struggle for existence where other less vigorous plants have succumbed.

The underground stem is creeping and stoloniferous, hence the wide-spreading character of the plant. The stem is rigid, erect, solid, quadrangular, hispid, and may be simple or branched.

It reaches a height of 2 or even 3 ft. The stem-leaves are on long petioles; the root-leaves wither early. They are ovate, cordate, serrate, the surface downy and the petioles are longer than the leaves, which, as in all labiates, are opposite.

The flowers are in whorls of six to twelve in a long spike, hairy and glandular.

They are dull purplish-red, the lower lip having white spots which render it more conspicuous. The lower bracts are serrate. The spike is long and interrupted. The bracts are leafy. The upper are

entire. There are minute bracteoles in the spike. The flowers are born on short pedicels. The calyx is sub-campanulate, with five segments which are equal, subulate and spinous.

The corolla has a cylindrical tube which may equal the calyx or be slightly longer. It is sometimes two-thirds of an inch in length. The anther cells are divergent. The fruit consists of four nutlets. There are four stamens which are ascending, and the lower two are longer. The lobes of the style are nearly equal and divergent. The anthers ripen before the stigma. The plant, however, is capable of being self-pollinated. The tube is longer than in the Marsh Woundwort. On opening the outer anthers are in front of the inner, and after shedding pollen turn up, and the inner are thus exposed, shed pollen and make room for the pistil which takes their place.

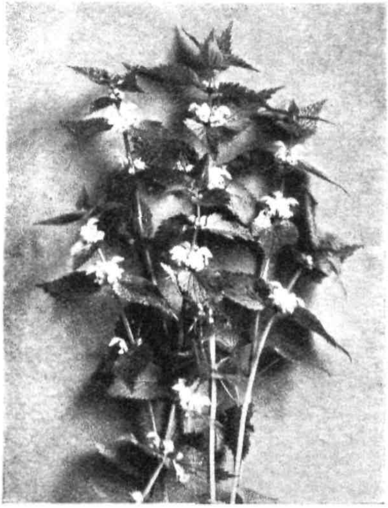
The nutlets are shaken out by the wind.

White Dead Nettle (*Lamium album*).

Next to the Woundwort the White Deadnettle is certainly one of the commonest wild flowers. It is found in nearly every county in the British Isles, except a few Welsh and Scotch counties.

Whilst the Purple Deadnettle is found almost exclusively on garden ground, the White Deadnettle, though occurring commonly side by side with it, is also found in more native stations. Thus it is a common hedgerow plant along the wayside. It also

B. Hanley. FIG. 53.—WOUNDWORT. *See page* 171.



W. Bell. FIG. 54.—WHITE DEAD NETTLE. *See page* 172.

grows in meadows and fields in the hedges, and occasionally on grass in the open. But a sure place to find it is on waste ground and near houses.

The stems are numerous, decumbent at the base, and then erect, quadrangular, hollow, succulent, hirsute. The leaves are opposite, cordate, acuminate, serrate, on petioles, deflexed, the tips of the teeth reddish, incurved, veined.

The flowers are in whorls containing six to ten. The tubular calyx is sessile, ribbed, and has purple spots, with short linear teeth. The corolla-tube is longer than the calyx, villous within, with a dilated throat.

The White Deadnettle is a foot or more in height. Flowers may be found from April to September, but it is practically perennial.

The honey is secreted by the expansion of the ovary in the lower part of the tube.

The upper lip serves as a hood, and hairs within effectually protect the pollen from rain. The great expansion of the upper lip allows humble bees to insert the head.

Short-lipped insects cannot do this, however, as the corolla is contracted below, where there is a ring of hairs. Insects alight on the lower lip, projections at the side serving as a lever by which they may push the proboscis down the tube. The upper lip is constructed so that the pistil and anthers do not yield to pressure too readily. This secures the transfer of pollen from other flowers.

Four anthers lie on the margin of the tube, and one is abortive, there being a short and a long pair.

The stamens touch the back of the bee as it pushes its proboscis down the tube, and the pistil also projects downwards between the anthers. A bee conveys fresh pollen to the stigma before it touches the anthers, so that by this contrivance the flower is cross-pollinated.

The nutlets are schizocarps and fall around the parent plant.

Woundwort has been used as a tea or herbal drink.

CHAPTER IV

APETALÆ (MONOCHLAMYDEÆ)

THIS group is also called Incompletæ. The corolla is absent whilst the calyx is present. But there are petals in Illecebraceæ.

The flowers may be borne in catkins with the perianth single and inferior. There is no perianth in Euphorbia. The flowers are unisexual in Euphorbiaceæ and Ceratophylleæ, and vary between this and bisexualism in Chenopodiaceæ and Urticaceæ.

The flowers are not in catkins, but have a single perianth, which is superior in Loranthaceæ, Santalaceæ, Aristolochiaceæ.

The ovary is superior, with two to three stigmas, in Polygonaceæ, Chenopodiaceæ, Urticaceæ, Ulmaceæ, and in Thymelaceæ the stigma is undivided. The ovary is inferior in Loranthaceæ, Aristolochiaceæ, and Euphorbiaceæ.

There are eleven families in this group, and we have included two and described four species to illustrate them.

The Nettle Group.

There are two British Nettles, and another plant, Pellitory-of-the-wall, included in the order Urticaceæ. The total number of species found throughout the world is nearly five hundred in the temperate and tropical regions.

They are herbs or undershrubs without any latex. A few reach the size of trees. Hemp, which also is occasionally found in Britain as an escape related to Hop and included in the order Cannabineæ, is nearly allied to the Nettle.

Amongst foreign related plants are the bread fruit, fig, and others, but these are now placed in different orders.

They are divided into two groups, those with stinging hairs such as Nettle, those without, such as Pellitory.

Of the East Indian Nettle, *Urtica crenulata*, De La Tour writes:

" One of the leaves slightly touched the first three fingers of my left hand; at the time I only perceived a slight pricking, to which I paid no attention. This was at seven in the morning. The pain continued to increase. In an hour it had become intolerable; it seemed as if someone was rubbing my hand with a red hot iron. Still there was no remarkable appearance, neither swelling, nor pustule, nor inflammation. The pain spread rapidly along the arm as far as the armpit. I was then seized with violent

sneezings, and with a copious running at the nose. About noon I experienced a painful contraction at the back of the jaws, which made me fear an attack of tetanus. I went to bed, hoping that repose would alleviate my suffering, but it did not abate; on the contrary, it continued nearly the whole of the following night; but I lost the contraction of the jaws about seven in the evening. The next day the pain left me. I continued to suffer for two days, and the pain returned when I put my hand into water; and I did not finally lose it for nine days."

When boiled, nettles do not retain their stinging properties, and are in fact used as a salad.

In Urtica the leaves are opposite; in Pellitory they are alternate. The stem is square, furrowed, erect or decumbent at the base, with rooting stolons, with stipules. The flowers are in a cyme, and unisexual, very small and green. The calyx consists of four to five segments, and is concave, free or united. The stamens are of the same number, bent down in bud, and when ripe they explode. The fruit is an achene, hard and dry, one-seeded. The flowers are pollinated by the agency of the wind.

LITTLE NETTLE (*Urtica urens*).

Perhaps because the stinging properties of the Little Nettle are even greater than those of the larger and more common one, it has received in Latin the redundant second name of *Urens*, burning.

The Little Nettle is not so widely dispersed as the larger one. The usual habitat, in fact, is cultivated land, and especially the neighbourhood of manure heaps, and the open ground around farm buildings and stackyards. Thus a few plants may usually be found in and about a village or the outskirts of a town.

It is an annual, moreover, unlike the other plant, the Common Nettle, which is perennial.

The stem is erect and branched and shining, glabrous, except where the stinging hairs are situated. The leaves are opposite, ovate, elliptic or oblong, coarsely serrate, on short stalks; the teeth few but large, the terminal one longest, and on each side are two stipules at the base.

The flowers are uni-sexual, in axillary spikes or panicles, paired. The spikes are nearly simple, and not so long as the petiole, with few flowers in a cluster.

The pedicels may be long or short. The Little Nettle is rarely 1 ft. high. It is in flower from June to September.

Like the other Nettle, it is pollinated by the wind.

NETTLE (*Urtica dioica*).

Owing to the vexation caused by the stings inflicted by its hairs, the Stinging Nettle is held in respect by old and young alike. Universally common, it is found in every county as far north as the Shetlands. It is found at an altitude of 2500 ft. in the Highlands.

B. Hanley. FIG. 55.—LITTLE NETTLE. See page 177.

B. Hanley. FIG. 56.—NETTLE. See page 178.

A hedgerow is the favourite habitat of the Nettle. It lines most of the ditches of our roads and highways. Fields, whether meadow or pasture, are also a sure place in which to find it, along the hedgerow or in the ditch. As it likes open, broken ground, it is to be found where a manure heap has been made or in the garden. It cannot compete with grass. It is thus also fond of the more open conditions in a wood, loving the shade as a rule.

The roots are yellow, fibrous and strong, being used like hemp. They frequently interlace. The stems are more or less erect, numerous, slightly branched, quadrangular, sulcate, with rigid stinging hairs arising from a tubercle with poison at the base. The leaves are cordate, ovate, serrate, opposite, stalked, deeply veined, and with hairs on both surfaces.

The plants are diœcious in axillary spikes; the panicles lax in the male flowers, dense and recurved in the female.

The calyx encloses the fruit directly, which is single, ovate, shining white.

The Nettle reaches the height of 2 to 4 ft. Flowers are to be found between July and September, but often earlier.

The stamens explode on the opening of the flower, scattering the pollen, which is dispersed by the wind. The stamens are bent down inwards in bud.

The fruit is small and falls to the ground when ripe around the plant, or it may be blown away by the wind.

The Nettle is also called Naughty Man's Plaything, Stinging Nettle, Scaddie, Stingy Nettle, Tinging Nettle.

The first Latin name is derived from *uro*, I burn, in allusion to the burning character of the poison contained in the hair tubercles.

Nettles used to be thrown on the fire to guard against lightning.

As it was associated with the Devil it was regarded as the Devil's apron. It was supposed to have the power of driving away evil spirits.

Nettle Tea is used as a remedy by the peasants for nettle-rash.

THE ELM GROUP.

The British Elms constitute an order in themselves of a single genus Ulmus, and, as generally understood, two species.

But critical study of the Elms, following Dr. C. E. Moss, shows that there are a number of species. By some the Elms were included in Urticaceæ. Including foreign species there are about one hundred and thirty species of this Order, which are mainly shrubs or trees. Though the order was formerly associated with Urticaceæ, the plants included in it possess a two-celled fruit and hermaphrodite flowers. They are natives of the temperate regions, in India, N. Asia, N. America, China, and Europe.

The Elm has many uses, being a valuable timber tree. It has been used in dyeing, the bark being

highly astringent. The Elms are also bitter and mucilaginous in character.

The Wych Elm differs considerably in habit from the Common Elm, having a twisted trunk which branches, soon giving off long tapering branches which droop at their extremity. The Common Elm is an erect tree which sends up some distance from the ground two main trunks, with smaller ones which are either ascending or horizontal.

In the Wych Elm the seed is in the centre of the samara or winged capsule.

In the Common Elm the seed is above the centre of the samara. The former produces fertile seed commonly, and also suckers; the latter rarely ripens its seed, and is planted or reproduced mainly by suckers. It fruits successfully on the Continent.

The Elms are deciduous trees, with a thick trunk, often reaching a height of 80 ft. The bark is thick, cracked longitudinally and horizontally with age.

They have a watery juice. The leaves are in two rows, simple, asymmetrical, with stipules, rough or smooth, oblique.

The flowers are bisexual, in clustered cymes, not catkins like many of the trees. The perianth consists of four to five segments, which are free or united, bell-shaped, persistent. There are four to nine stamens, which are inserted on the calyx, and opposite the lobes.

The styles are two in number. The ovary is one to two-celled, with solitary ovules.

The capsule is compressed and winged or not; a nut, samara, or drupe. There is no endosperm.

The flowers are pollinated, and the seeds dispersed, by the wind.

COMMON ELM (*Ulmus campestris*).

There is an idea that the Common Elm is always planted and never ripens its seed, but this is certainly a mistake. I have seen a form (*Ulmus glabra*) which does so in Leicestershire, and the type here and there also growing spontaneously.

It is general throughout this country, and is found in Derbyshire at a height of 1500 ft. It is not so abundant in Scotland, but is found in Ireland and the Channel Islands. Under the type form or its varieties it is thus well distributed, showing that if introduced it was a very long time ago.

The Common Elm is found as a rule in hedges and in fields, often in wayside hedges, where long avenues of it may be seen. This Elm is also common in parks and gardens. When it is found in woods it has always been planted.

It is a large tree 120 to 125 ft. high, erect, with spreading branches at no distance from the ground, and with a second series of branches near the top of the tree. The trunk or bole has a girth of 20 ft. when full grown.

The bark is rough and cracked longitudinally and horizontally. It is said that the roots send up

A. R. Horwood. FIG. 57.—COMMON ELM IN WINTER. *See page* 182.

G. B. Dixon. FIG. 58.—WYCH ELM. *See page* 183.

suckers, but though they are far-reaching, they do not always do so. It is the Wych Elm that produces suckers. The twigs in one form are corky. The leaves are not so large as those of the Wych Elm, narrow at the base, rough above and downy below, but in *U. glabra* are glabrous. This last form has drooping branches like the Wych Elm.

The perianth is not so large as in the Wych Elm, and there are four stamens. The samara is smaller, with the seed above the middle. The samara is obovate or oblong, and the notch has the points often twisted and incurved.

The flowers appear before the leaves, and are not in catkins like the *Cupuliferæ*, and are bisexual. The male flowers are below the female, and the pollen is dispersed by the wind and blown upwards.

The winged samara is adapted for dispersal by aid of the wind.

The Common Elm is in flower from March to May. The glabrous form does not come into leaf till much later, and flowers later.

The Common Elm is a favourite tree for planting in parks. The wood is a valuable timber, used for coffins, planks, etc. The bark is used for tanning.

Wych Elm (*Ulmus montana*).

There is evidence that this Elm is native. There are a few counties where it is absent, however, in England and Scotland and Wales, but it grows in

Ireland and the Channel Islands. It is found at a height of 1300 ft. in Yorkshire.

Though this graceful Elm is so common in the hedgerow by the roadside, where its wide-spreading branches cast a grateful shade above the road and make avenues, yet it is found also commonly in woods, where, unlike the Common Elm, it may be regarded as truly native. It is also common in fields, in the hedgerow, in parks, gardens and similar places.

It can be recognised at once by its drooping branches and often twisted trunk. The bark is deeply furrowed, corky. The branches are sent out near the base, or higher up, but always hang down at the extremity. The leaves are large, acuminate, doubly serrate, and unequal at the base. They are very rough above, and downy below. The twigs are pubescent, and are not corky.

The flowers are apetalous, with a ciliate perianth containing six to eight anthers with obtuse lobes. The samara has the seed in the centre, with a veined winged appendage, and notched above.

The Wych Elm is 80 ft. in height when well grown. It is in flower from March to April.

The bisexual flowers have five filaments with anthers opening externally.

The styles are subulate, two in number, and stigmatic on the inner surface.

There are leaves at the base in the lowest ten to twelve axils with flowers above, in dichasial cymes

reduced to one flower. The pollen is wind-dispersed.

The samara is winged, and disperses the seeds by aid of the wind to a distance from the tree.

The Wych Elm is also called Chew Bark, Broad-leaved Elm, Scotch Elm, Witch Elm, Halse, Witch Hazel, Helm, Mountain Elm, Orne Tree, Witch, Witch Wood, Wych Wood.

An old writer says it is called Chew Bark because —"The inner bark of the Elm, for a certain pleasant clamminess, is chewed by children, and hence the tree is called chew bark."

The name Wych Elm was applied because the wood was used to make chests called wyches, hueches. The name Witch Hazel has reference to the resemblance between the leaves and those of the Hazel.

ACHLAMYDEÆ.

In this group both calyx and corolla are absent, except in Cupuliferæ.

The flowers are unisexual, the males are in catkins, the females in catkins or spikes.

It includes Salicaceæ, Cupuliferæ, Betulaceæ, Myricaceæ. In Myricaceæ the flowers are of both sexes in the axils of imbricating bracts. The plants are mono-diœcious. In Salicineæ the plants are diœcious.

Most are trees or shrubs and are pollinated by the wind, their fruits being also wind-dispersed to a great extent.

Certain types of woodland are characterised by the dominance of either the pedunculate or sessile types of Oak. The former grows on clays and loams, the latter on sandstones.

There are a few old Oaks which date from about the time of the Conquest, but they are few and far between. In addition to forming forests and woods, the Oak is commonly planted in hedgerows along the roadside and in fields, parks and gardens.

The trunk is thick and massive but it reaches a height of 60 ft., or even more when well-grown. The bark is furrowed, the furrows not so wide as in the Elm. The trunk is erect, with wide, outspreading, massive branches, others ascending in a radiate manner. The leaves are yellowish green in the pedunculate form, dark green in the other, on short petioles in the one or sessile. They are thick, coriaceous, shiny, sinuate, dentate, the lobes deep.

The flowers are apetalous, green, the male flowers in drooping catkins with a bract below, and the female in a clustered spike, the bracts overlapping and forming an involucre. The fruit (an acorn) is one-seeded, oblong, pedunculate or sessile, enclosed in a cupule below of imbricating scales. The acorns are distant.

The flowers are in bloom in April and May.

The flowers, as in most other trees, are pollinated by aid of the wind. The acorn when ripe drops from the tree from sheer weight. It is also dispersed by squirrels and other rodents, and by birds, especially

W. Bell. FIG. 59.—OAK (WITH BIRCH AND BRACKEN). *See page* 137.

C. Mosley. FIG. 60.—OAK (in flower). *See page* 187.

rooks, and other animals. Boys play with them and accidentally disperse them in the same way. In a gale they are liable to be blown also to a great distance.

It has numerous local names, such as Aac, Acharne, Achorn, Ackeron, Ackern, Acorn Tree, Aik, Aik-tree, Akcorn, Ake, Akers, Ake-horn, Akernel, Akeron, Akkir, Akkern, Akran, Akir, Archarde, Atchern, Atchorn, Cups and Ladles, Cups and Saucers, Eike Tree, Frying Pans, Hatch Horn, Jove's Nuts, Knappers, Mace, Mast Oak, etc.

ALDER (*Alnus glutinosa*).

Unlike most other trees, except Willows and Osiers, the Alder is found chiefly in lowland districts, since it is fond of water, and thus grows where such moist habitats are to be found.

It is general in the British Isles, however, though it does not ascend to any great height.

The habitat favoured by the Alder is as a rule the side of a stream or river in a valley, though it may grow at slightly higher levels where the conditions are moist. It is often associated with the White Willow in marshy places, and with the Oak when this last grows on wet soils. Where, indeed, the Alder grows freely, you will find a moisture-loving association of plants.

It is not a very tall or straight tree. The trunk and the branches have a peculiar crooked arrange-

ment. The height is not often 70 ft., and may usually be between 20 and 40 ft. with a trunk 2 ft. in diameter.

The bark is cracked, black; the wood is white before it is felled, then red, and later pale pink.

The leaves are rounded, obtuse, on short stalks, glutinous, truncate above, and wedge-shaped below, and hairy in the young stage, sinuate, serrulate. The axils of the veins below are downy. There are ovate stipules.

The male catkins have peltate scales, long and pendant, bracts red, orbicular; the female are short, oblong, obtuse, terminal, in a raceme, and the reddish-brown bracts are woody. The latter persist for a long time. The flowers appear before the leaves.

The fruit is pale, compressed, one-celled, one-seeded, and has a scarcely perceptible wing.

The flowers are pollinated by the aid of the wind. The fruit is dispersed also by aid of the wind.

The Alder is a very early flowering tree, and one may find it in bloom in March and April.

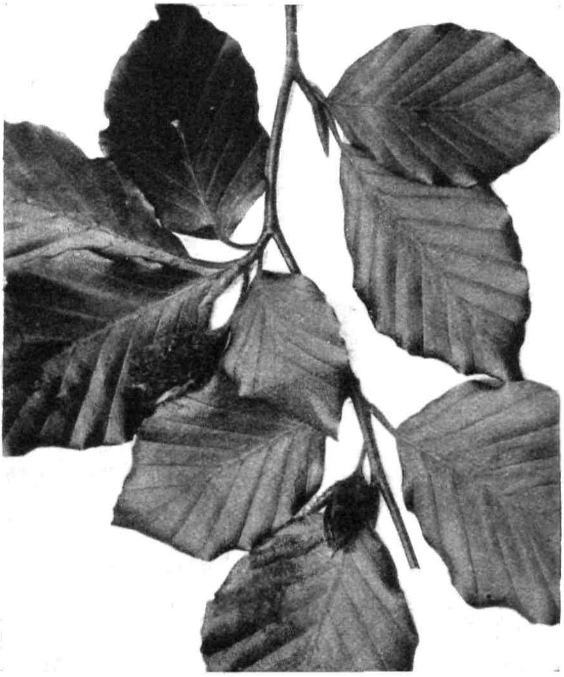
The wood is used for a variety of purposes, being durable though soft.

In Shropshire it is largely used for making clogs for the Lancashire mill-hands.

BEECH (*Fagus sylvatica*).

The Beech is a true native, though Cæsar does not mention it. As it is confined, when native, to

W. Bell. FIG. 61.—ALDER. *See page* 198.



B. Hanley. FIG. 62.—BEECH (in fruit). *See page* 190.

certain types of soil derived from chalk or oolite, it is therefore not so general in its distribution as our other forest trees.

In Derbyshire it grows at an altitude of 1200 ft., and is planted in Scotland and Ireland.

The Chalk Downs of the South of England, the Oolite district of the Cotswolds, the Chilterns, are typical districts for the Beech. It forms woods and forests. It also grows on limestone. In many other parts of the country it is planted, and fine avenues of Beech are to be encountered along the highways or in parks and private grounds.

The habit is characteristic, with a straight trunk and usually two diverging main branches, from which are given off numerous smaller ones, which hang down more or less vertically. The leaves are ovate, dentate, the midrib well marked, the veins oblique and parallel, glabrous, with a ciliate margin, and in spring softly downy.

The flowers are apetalous: the male flowers pendulous in a head; the female borne on short peduncles. The fruit is triquetrous, smooth, and enclosed in a rough cupule, which is 4-cleft.

The Beech, when full grown, is as much as 70 ft. high. It is in flower in April and May.

The flowers are not regular in their appearance. The male flowers hang down in pendulous cymes, the females in pairs. The cupule contains two nuts, the mast. The stamens are eight to forty in the male flowers, and are exserted. The filaments are

the leaves are small the tree gives a good shade and cover beneath it. The leaves are long, lanceolate, serrate, glaucous below, shiny above, glandular on the upper surface, petiolate, acute. The brittle twigs can be cracked off with a touch of the finger. There are subcordate stipules.

The monœcious plants have spreading catkins, with yellow anthers, the male catkins long, the female slender. The scales are not long, persistent. The ovary is subulate, ovate, sessile. In the male flowers there is an abortive ovary.

The Crack Willow is known to reach a height of 90 ft., but it is more often 15 to 50 ft. The flowers are in bloom later than many of the other willows—from April to May.

The flowers have the usual structure of anemophilous plants. In some willows, however, as in Sallow, etc., insect visitors occur regularly, and the plants are cross-pollinated. The crowding of numerous flowers in one catkin renders them conspicuous, and easier for bees to feed upon. The male flowers are more conspicuous than the female, and the flowers appear before the leaves. They have an abundance of honey and pollen.

Flowering early they are specially sought after by bees. Bees, flies, beetles and Lepidoptera visit the Willows.

The seeds are fringed with hairs, and when the capsules burst they are dispersed by the aid of these structures by the wind.

The Crack Willow is also called the Snap Willow, of which a writer says it "is so brittle that every gale breaks off its feeble twigs."

SALLOW (*Salix Caprea*).

Amongst the bushy or smaller willows, next to the Osier the Sallow is the best known. It is more common than the latter, being found in all parts of the British Isles. In the Highlands it grows at the height of 2000 ft.

The Sallow is fond of woods, where it forms a sort of scrub, or grows interspersed with other scrub or bush plants. It is found not only in dry woods amongst oaks, but also with Alder and Willow in marshy ground. It is also common in wet places, growing by the sides of streams, rivers, lakes and ditches.

The Sallow is a shrub which seldom attains the tree habit. It is usually 8 to 10 ft. in height, but may occasionally reach a height of 20 ft. The plant is usually much branched, with a few large main branches, the bark sage green.

The leaves are ovate, flat, lanceolate, acute, crenate, reticulate, dark green above, cuspidate, with the margin recurved, the midrib downy, whitish above, cottony below. The stipules are subreniform. The whole plant has a silvery appearance. The catkins are silky, short, appearing before the leaves, sessile, the male being oblong, ovoid, the female

elongate, nodding at length. The male are shorter than the female. The scales are hairy with a black tip. The filaments are glabrous. The capsule is silky, lanceolate, subulate, with a very short style. There are two stamens. The disk is eglandular.

The catkins are borne on leafy peduncles. The capsules have a very slender pedicle. The buds are glabrous, whereas in *S. cinerea*, which resembles it rather, they are downy.

The flowers are adapted to pollination by the wind. They also, in possessing abundant honey and pollen, attract large numbers of insects, and in this way cross-pollination is easily effected.

The Sallow is not of any commercial value. It serves to make a good cover in plantations for game, and it is also utilised for firewood.

BIRCH (*Betula verrucosa*).

The Birch is one of those graceful ornaments of the landscape which help to give a distinct character to the scenery.

It is found in all parts of England and Wales, Scotland and Ireland, and in the Highlands grows at an altitude of 2500 ft.

As a whole the Birch is confined to hillier ground throughout this country, being especially abundant upon suitable rock soils (siliceous) in all the mountain districts, where it forms forests, or may grow with Oak and Hazel, and in some parts forms a sort of heath land or scrub.

It is not a lofty tree, being about 40 to 50 ft., with a slender, erect bole, with a silvery papery bark which readily peels away. The branches droop down at the extremity in a truly graceful and characteristic manner.

The leaves are truncate below at the base, glabrous, or with spots of resin on the surface, usually rather rhomboidal, and in an allied form they are pubescent, leathery, glandular in the young stage, flat below, with the veins prominent.

The petiole is slender; the stipules are broad, circinate, acute, three times as long as broad. The young shoots have resinous tubercles, and are often long and pendulous. The buds are conical. The scales of the female catkins are 3-lobed, the lateral lobes falcate, reflexed, the catkins, being solitary, shorter than the male, and suberect. The male catkins have peltate scales, two bracts, and three flowers with one to four sepals. There are two stamens with forked filaments separating the anther cells. They are pendulous. The female catkins have imbricate bracts and two to three flowers.

The fruit is lenticular, winged, with a notch in it, orbicular and obovate.

The Birch is in flower in April and May.

The tree is not a very valuable timber tree. It is liable to be attacked by insects. The bark is used for the purpose of tanning, however. The juice is sugary in spring, and wine has been made from this. The Birch yields a fragrant oil.

W. Bell. FIG. 65.—BIRCH. See page 195.

J. H. Crabtree. FIG. 66.—SPOTTED ORCHID. See page 201.

CHAPTER V

MONOCOTYLEDONS

THESE were originally called also Endogens, because the wood was thought to increase towards the centre. The stem has wood in longitudinal bundles, isolated, and not, as in Dicotyledons, in rings. There is no pith in the centre, defined as in Dicotyledons. The leaves usually have parallel veins, but in Arum they are reticulate.

The flowers are in threes or fours, never in fives. The embryo has but one cotyledon, and the first leaves are alternate. The original radicle is soon obscured by the growth of adventitious roots from the base of the stem.

A large proportion are aquatic plants. As a rule they are herbaceous, but a few, such as the Palms, are arborescent.

The leaves are not parallel-veined in Tamus, Paris, and are in fours in Naiadaceæ, and in Gramineæ in twos and threes.

The perianth may be petaloid in one group or absent.

PETALOIDEÆ.

The perianth in this group is petaloid and often brightly coloured. The perianth is superior in Hydro-

charidaceæ, in Orchidaceæ, Iridaceæ, Amaryllidaceæ, and Dioscoraceæ, in which the perianth is irregular or regular.

In Bryony the plant is climbing and monœcious.

The perianth is inferior or wanting and the carpels free in Alismaceæ, Naiadaceæ, the carpels united in Liliaceæ, Trilliaceæ, Melanthaceæ, Juncaceæ, Araceæ, Lemnaceæ, Typhaceæ.

The flower is spadiceous in Araceæ. It is unisexual in Hydrocharideæ, Dioscoraceæ, and in some Aroideæ or Naiadaceæ, monœcious in Eriocauloneæ and Typhaceæ.

In the rest it is bisexual. In Typhaceæ, Aroideæ, and Lemnaceæ the perianth is absent or rudimentary.

There are thirteen families in this group, of which we include five—Orchidaceæ, Iridaceæ, Melanthaceæ, Dioscoraceæ and Juncaceæ—and five species are described.

The Orchid Group.

This is one of the most popular orders of British plants (Orchidaceæ), including some of the most lovely species, and the fabulous prices given for some of the foreign Orchids has perhaps also raised them in the public estimation.

As a whole they are herbaceous and occur in all parts of the world, but especially in the warmer countries. Many of this group in the Tropics are epiphytes attaching themselves to the branches of trees, stones and rocks, to which they fix themselves

by means of their long fleshy roots. The Bird's Nest Orchid derives its nourishment from the roots of trees.

There are about five thousand species of Orchids and four hundred genera. Some, the majority, are land-plants, terrestrial, a number are epiphytes and some saprophytes.

Dr. Lindley writes of this group :

"There is no order of plants, the structure of whose flowers is so anomalous as regards the relation borne to each other by the parts of reproduction, or so singular in respect to the form, texture and colour ; neither have they any similitude to the changes of outline that are met with in such irregular flowers as are produced in other parts of the vegetable creation. On the contrary, by an excessive development and singular conformation of one of the petals called the labellum or lip, and by irregularities either of form, size, or direction of the other sepals and petals, by the peculiar adhesion of these parts to each other, and by the occasional suppression of a portion of them, flowers are produced so grotesque in form that it is no longer with the vegetable kingdom that they can be compared, but their resemblance must be sought in the animal world. Hence we see such names among our native plants as the Bee, Fly, Man, Lizard, and Butterfly Orchis, and appellations of a like nature in foreign countries. One orchid in particular mimics a monkey, another a dove descending, hence the plant is called Spirito Santo."

The stem may be of three types, characters which serve to divide them up into three groups, and it is simplest in Ophrydeæ.

The leaves are usually sheathing at the base, membranous, but may be petiolate, articulate, and hard, with no sheath, as in Vanilla; or they may be coriaceous and have no veins, or membranous and strongly ribbed.

The flowers are in three parts, with three sepals, three petals, the lowest spurred, the lateral ones different, the exterior labellum being anterior at first, the flower stalk twisting and curving. In the centre is the column of stamens and style, usually single, opposite the intermediate sepal, alternate with the petals.

The column is often surmounted by a single anther, and in Cypripedium and Apostasia there are two stamens, and thus two groups are formed on this ground. The anther is generally two-celled, but may be divided into three or four cavities. The pollen consists of lenticular or spheroidal grains singly or in pairs, threes, fours, etc., and is powdery or viscid, or raised in a mass on short stalks and held together by elastic filaments, forming an axis to which pollen adheres and the axis may be like a strap or a caudicle. The stigma is a viscid hollow. The fruit is a capsule, three-valved, with three rows of seeds.

The Orchids are more ornamental than useful. They have greatly decreased from the first cause in recent years.

The common *Orchis mascula* yields jalep or salep, a nutritive juice derived from the roots. Vanilla is a spice of importance. The " air plants " with their clinging roots are often grown in the hothouse on wire, etc. Anagræcum yields a sort of tea.

Usually the flowers are in a raceme or in a spike, and are usually also spurred.

Spotted Orchid (*Orchis maculata*).

This is one of those beautiful wild flowers that help to make the country gay in early summer, and, being common, it is fairly well known. There are only a few Welsh and Scotch counties where it does not grow. In the Highlands it grows at the high elevation of 3000 ft.

The Spotted Orchid is always found in a moist situation. As a rule it may be found in most lowland marshy tracts. Wet meadows are a special habitat for this pretty species, where it grows in great quantities. Where little streams run down from the sides of a hill the Spotted Orchis grows also in profusion.

The stem is a scape only with sheathing leaves, with a tuberous root. The leaves are spotted, as indicated by the name. The stem is solid, slender, the leaves lanceolate-acute, somewhat recurved; the bracts have three veins, and are green, subulate, about as long as the ovary.

The flowers are a delicate lilac, crimson spotted, and arranged in a spike. The lip is trifid, flat, crenate,

the spur not so long as the ovary, cylindrical, awl-shaped. The three sepals are connivent and the lateral ones are patent. The lip has the margins recurved.

The Spotted Orchid grows to a height of 1 ft. It is usually in bloom in June and July.

The mechanism of the flower is closely similar to that of *Orchis mascula*. The spur is straight, and the lip is divided into three lobes. The middle lobe is narrow and equal in length to the lateral ones, which are toothed. It is attractive to insects, and is visited by humble bees and flies.

As in many other orchids the seeds are very minute and are readily blown out of the capsule by the wind, but the seeds do not often germinate, and the plant is probably increased mainly by division of the tubers.

The Spotted Orchid is known by a number of other names in different parts of the country, such as Adam and Eve, Adder's Grass, Bald Berry, Crawfoot, Dead Man's Fingers, Dead Man's Hands, Hen Combs, Lover's Wanton, Man Orchis, Meadow Rocket, Mount Caper, Pull Dailies, Red Lead, Salep.

Salep was made from the Orchid mentioned above, *Orchis mascula*.

The Iris Group.

Well known from the favour in which they are held in the garden the Iridaceæ are a well-marked

group, their ensiform leaves and violet or yellow flowers being extremely characteristic. The Crocus also holds a first place in the popular mind as one of the flowers of Spring, rivalled alone by the Snowdrop.

There are about eight hundred species and fifty-seven genera, which are found in the temperate and tropical regions, especially South Africa and America.

In the Crocus group the flowers are solitary or at most usually two, and the plants are small, including Crocus and Romulea. The latter is now extinct, golf-links at Dawlish being responsible. In the Iris group the flowers are numerous, in spathes, several in each spathe, and are usually regular.

The stem is distinct and the leaves equitant. The order includes Iris and Sisyrinchium, the last only found in Ireland and derived from America. I found a plant in a stableyard in Leicestershire which was brought over in peat-moss litter. In the Ixia group the flowers are like Iris, but the spathe is one-flowered.

These plants usually have a tuber or rhizome below. The leaves are equitant, in two rows. The veins in the leaves are parallel, converging to the apex. The plants are herbaceous.

The outer perianth is made up of bright-coloured sepals which resemble petals, generally curved back, whilst the petals alternate and are erect. The flower-head is terminal and cymose. Below the perianth is united into a short tube, or a long one. It is, in fact, six-cleft in two rows, free in the young plant, after-

wards united. There are three stamens which spring from the base of the sepals, and have broad, flattened, filaments and long anthers, which divide like an arrowhead above, with two longitudinal grooves opening outwards. The style is trifid as a rule, and frequently petaloid, and there are three stigmas. The capsule is three-celled and the seeds numerous, in three valves.

In this group beside Iris and Crocus comes Gladiolus, of which *G. illyricus* is found in the New Forest, but it is becoming very scarce.

The garden forms are showy plants, and Ixia also is a favourite garden plant. Orris root is yielded by a species of Iris and the roots of others are eaten.

YELLOW FLAG (*Iris Pseudacorus*).

This handsome wild Iris is found in most districts where there are suitable moist conditions, being known in every county in Great Britain.

It forms a regular member of the aquatic vegetation of low-lying districts. It grows at the margin with the lower part of the stem and leaves submerged, deeply rooted in the mud a little further out than the fringing zone of sedges which lines each piece of water where aquatic vegetation is well established. It is to be found in ponds, pools and lakes, as well as in running water, in streams and rivers. It may also be found in marshy tracts which are a transition between aquatic and terrestrial vegetation.

Fig. 67.—[illegible]

B. Hanley. Fig. 68.—Meadow Saffron. *See page* 207.

The Iris is a tall, erect plant with radical leaves which are equitant, and the plant has the grass habit. The leaves enclose the scape at the base with a sheath. The leaves are ensiform, flat, lanceolate, and are not, as in the Sweet Flag, wrinkled at the margin.

The scapes bearing the flowers are tall, terete, the flowers large, yellow, the petals suberect, stipitate, the margins incurved, the outer ones of a clear yellow tint, the blade obovate, and the claw short. The stigmas are conspicuous and yellow. The triquetrous capsules are three-ribbed, the seeds flat and numerous.

The height attained by the Yellow Flag is 3 ft. or more. June is the time of flowering.

Honey is contained in the flowers. The sepals are petaloid, and bent down externally. The styles are also petaloid, and opposite them, and the stamens inserted at the base are below them, the filaments free, the anthers opening outwards. The flowers being large and conspicuous and fragrant, the stigmas arching over the stamens, insects touch the former and bring fresh pollen to it in the effort to reach the pollen below the stamens. There is a flap just above the anthers on the outer side of the style which is the stigma, and insects on withdrawing from a flower close up the flap, thus preventing self-pollination. Bees, humble bees and flies visit it.

The capsule dehisces above, and the seeds, which are smooth and flat, are blown out by the wind.

The Yellow Flag is known also by the names Butter and Eggs, Cucumbers, Daggers, Dragon Flower, Flags, Jacob's Sword, Yellow Sedge.

THE MEADOW SAFFRON GROUP.

The Order Melanthaceæ is included by some in Liliaceæ, and has relationship both with them and the Iris Group. It includes amongst British plants Meadow Saffron, Bog Asphodel and Tofeildia. The former grows in low-lying meadows, the latter in bogs and mountain rills.

These plants are found mainly in the temperate regions, and have the lily habit. They are acrid plants. Colchicum is poisonous to cattle and has been used as a cure for gout.

In Colchicum the perianth is funnel-shaped with a long tube; in the two other genera it is six-partite. The style is long in Colchicum, short in Tofeildia, and undivided in Bog Asphodel. In the Meadow Saffron the capsules are connected throughout; opening introrsely in Tofeildia it is connected to above the middle and is one-celled, whereas in Bog Asphodel it is three-celled and dehiscence is loculicidal.

The stem, a scape, is erect, the leaves linear, lanceolate erect, and vernal in Meadow Saffron, and in the others ensiform. There is a rhizome in Meadow Saffron and Bog Asphodel, or a corm in the first. The flowers of Meadow Saffron are autumnal.

The calyx and corolla are similar, the perianth

being inferior, and of six to seven segments (in Liliaceæ there are six), united below into a tube, much as in Iridaceæ. There are six stamens on the receptacle or perianth.

The anthers open extrorsely, and are attached below the middle. The ovaries are three-celled and superior. The style is three-cleft (1 to 3). There are several ovules. The capsule is three-celled and the fruits open inwards, or consist of three one-celled follicles. The seeds are enclosed in a membrane.

There is no honey in Bog Asphodel though the flower is conspicuous.

In the Scottish Asphodel there is a calyculus below the perianth.

MEADOW SAFFRON (*Colchicum autumnale*).

The Meadow Saffron is a rare plant which, however, is found in a number of districts in the British Isles, but is probably only naturalised in Scotland.

As the English name indicates its habitat is a meadow. As it is a poisonous plant it is often eradicated in such places on account of harm done to cattle. I know spots in Leicestershire where this has happened, and the plant is no longer to be found there now.

It has a rather large, compressed, corm, with shining, chestnut scales. The leaves, which die down in summer, are radical, flat, broad and large, lanceolate with numerous approximate veins. There are

spathaceous bracts. The sheaths of the leaves are long and thick.

The flowers are solitary, arising from the corm, and appear later in the autumn. They are erect, and in shape like a crocus, pale purple or white.

The ovary is subterranean. The perianth tube is very long, 2 to 6 in., with a long limb, campanulate. The stamens are included in the perianth and the filaments are thread-like. The anthers are yellow, oblong and open inwards, afterwards twisting outwards.

The perianth is petaloid and divided into six segments. There are three styles with recurved tips which are stigmatic within.

The capsules are three-valved, membranous, with three grooves, on short peduncles, ellipsoid, acute both ends, and they are concealed below the ground till the spring, when they rise above the surface, the stalk lengthening, and are then ripe. There are spring flowers which are imperfect and green in colour.

The flower contains honey and is conspicuous, and the stigmas ripen before the anthers. Bees are the chief visitors, but in their absence the plant is self-pollinated.

The capsules split open, and the numerous small seeds are dispersed around the corms.

It flowers in August up till October.

The seeds and corms yield a drug which has been used as a remedy for gout.

It is called Colchicum in Latin, from Colchis, a country once famous for its herbal remedies.

B. Hanley. FIG. 69.—MEADOW SAFFRON. See page 207.

B. Hanley. FIG. 70.—BLACK BRYONY BERRIES. See page 210.

THE BLACK BRYONY GROUP.

This is the group (family Dioscoraceæ) to which the Yam belongs. The order contains about one hundred and seventy species included in nine genera which are found in warm, temperate and tropical regions, especially America.

They are either shrubs with a fleshy tuberous root or rhizome, or are climbing or trailing plants; the stems are herbaceous, and the plants twine to the left.

There is but one genus in the British Isles of this order, Tamus or Black Bryony. This is extremely acrid and the berries poisonous. Dioscorea affords tubers which are used for food, as "Yam," cultivated like the Potato. It is a twining plant and is propped up like Hops on poles. The tubers are farinaceous, white and mealy, but they are acrid and poisonous unless cooked, when they are nutritious. The other genus, Testudinaria, is employed in the same way.

A characteristic of this order is the diœcious character of the flowers, and other points are the adherent calyx and corolla, the three-celled ovary, six stamens, numerous-seeded berry and consolidated carpels.

The twining habit is characteristic, the plants requiring the support of a hedge to grow properly.

The root-stock is black and fleshy, and may be used in place of Bryonia for mandrake occasionally. The stem is terete and glabrous, with alternate net-veined

or reticulate leaves resembling Dicotyledons (though the order is monocotyledonous), or the leaves may be sagittate. They are borne on long stalks or petioles. The leaves may be glossy, ovate, cordate, acuminate, and entire, rarely opposite.

The inflorescence is in a raceme, the flowers being regular, and inconspicuous, small and green, with one to three bracts.

There are staminate and pistillate flowers, which differ only in the floral structure. The perianth is six-cleft, tubular at the base. There are six anthers, or three anthers and three staminodes, which are situated on the base of the perianth.

The ovary, which is usually three-celled, is inferior, the style is three-cleft, and the fruit is a dry capsule or berry, red when ripe, and poisonous, being strongly emetic. The seeds are winged.

Black Bryony (*Tamus communis*).

This common wayside flower is found in most of the counties in the British Isles except some parts of Wales and the Isle of Man.

It is a typical hedgerow plant, being a climber and needing some support. It also grows in the same situation in fields, meadows and pastures. The Black Bryony may also be found in woods and thickets, preferring a more or less shady habitat.

The habit is that of a climber or trailer. The stem is terete, striate, hard, and much twisted or undulating. There is a thick tuberous root. The

leaves are net-veined with five to seven veins, cordate below, acuminate, shining, rather dark green, or yellow, the petioles very long.

The plant is diœcious and the flowers are yellowish-green. The male flowers are single or in racemose clusters, which are branched below. The female flowers are few, in short recurved racemes which are axillary.

The Black Bryony is often 8 to 10 ft. in height, frequently overtopping the hedge. It flowers in May and June.

The perianth is campanulate, and the flowers are quite small. The stigmas are bilobed. There are rudimentary flowers in the allied Dioscorea. The plant depends for fertilisation upon the cross-pollination by insect visitors.

The fruit is a berry, red when ripe, poisonous, but attractive to birds and dispersed by them.

Black Bryony is also called Adder's Meat, Adder's Poison, Beadbind, Bindweed, Broyany, Elpham, Isle of Wight Vine, Lady's Seal, Mandrake, Murrian Berries, Oxberry, Poison Berry, Roberry, Rowberry, Rueberry, Rollberry, Serpent's Meat, Snake Berry, Snake's Food, Wild Vine.

The name Snake's Meat is due to the idea that it is always found where snakes are to be found. As the stem is flexuous this may be the reason—by Doctrine of Signatures!

Farmers collected the berries formerly as a cure for barrenness in cattle, hence the name Oxberry.

Black Bryony was also used for wounds or bruises, the roots being made into a plaster and applied to the injury.

The Rush Group.

Rushes, like grasses and sedges, are associated in wide patches and give a character to the vegetation. They are also influential in rendering permanent marshy tracts liable to be flooded by preventing the soil of low-lying ground from being washed away, maritime forms serving the same purpose on the coast.

There are about two hundred species of the order Juncaceæ, and seven genera which are found in cold and damp regions in the temperate and arctic zones.

Formerly rushes played a part now taken by carpets in our houses, and they were dipped in tallow and used as candles. Mats were largely made of them, and the bottoms of chairs are frequently to-day made of rushes.

In Juncus the whole plant is glabrous and the ovules are numerous, axile or parietal on placentæ, whilst in Luzula the plant is pilose, the three ovules being basal.

The Rush habit is characteristic, being similar to the grass habit, but more cæspitose and strict as a whole.

The plants are perennials with creeping rhizomes, the stem being a flowering stem, the leaves long, filiform, or linear lanceolate, grass-like in Luzula, rod-

like in Juncus, and narrow. The flowers are crowded in dense cymes, and are regular and pollinated by the wind. The calyx and corolla are similar, the flowers green or brownish, clustered.

The perianth is dry, scarious, or leathery, of six segments, sepaloid, the odd leaf in the inner whorl being posterior.

There are six stamens, or the inner may be absent, inserted on the base of the petals and sepals. The anthers open laterally, and the pollen is in tetrads (groups of four). The ovary is superior, made up of three carpels. The single style is simple with three stigmas, brush-like in form.

The capsule is loculicidal, three-valved, and contains many seeds, which are erect, with dense albumen.

Bullocks thrive well on coarse grasses and rushes.

Rushes are found on the margins of rivers, in bogs and marshes, and in wet meadows and fields converted from aquatic vegetation.

COMMON RUSH (*Juncus effusus*).

There are a large number of different kinds of rushes, though they are usually looked upon by the person who is not an expert as one and the same.

Most of them grow in large numbers, together forming an association. This one is common in all parts of the British Isles. In the Highlands it is found at an elevation of 2400 ft.

The plant is fond, like most rushes, of damp ground, being a moisture-loving species. It is thus found in wet places by the sides of ponds, pools and lakes, in fields and meadows where the ground is wet and marshy.

In marshes it is frequent, and it is to be found in ditches by streams and rivers, in lowland and upland regions alike.

It has the cæspitose or tufted habit of all rushes, with the grass habit in its foliage, etc.

The stem is rounded, finely striate, not glaucous, and may grow in a tuft. The stems and leaves are soft, not hard, with continuous pith, not septate, greenish, the leaves being almost reduced to sheaths.

The flowers are numerous in lateral cymes, which are compound, and vary in shape and size, the cyme being effuse and loose. The perianth is of an olive-green colour. There are three stamens. The segments of the perianth are continuous, lanceolate, and are longer than the capsule. The capsule is obovoid and retuse. The seeds are small and yellowish-brown.

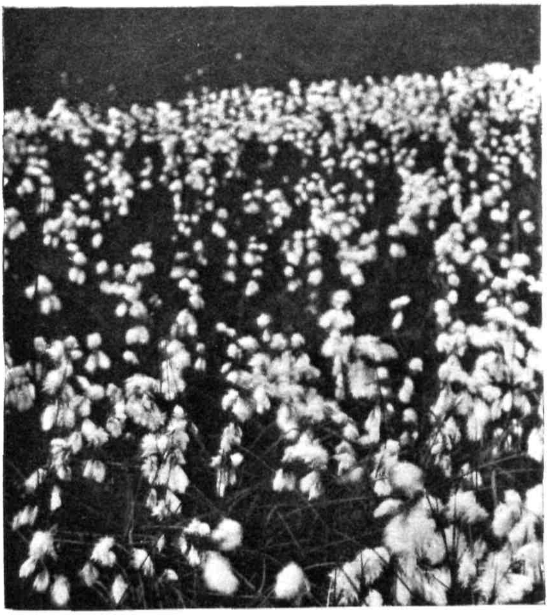
The stigmas ripen before the anthers, and the flower is pollinated by aid of the wind.

The Common Rush is 2 to 3 ft. in height. The flowers are in bloom in July and August.

Rushes were formerly used to strew the floors in place of matting or carpets.

They help to bind the soil together in marshy places, accumulating the silt. For bullock raising they serve as a good pasture food.

G. B. Dixon. FIG. 71.—THE RUSH-BORDERED POOL, WITH COMMON RUSH. *See page* 213.



J. H. Crabtree. FIG. 72.—COTTONGRASS. *See page* 217.

GLUMACEÆ.

This group includes the two families, the Cyperaceæ and Gramineæ.

There is no perianth, or if any it consists of chaffy scales (minute), or glumes. The flower is glumaceous and the stamens hypogynous.

The ovary is one-celled, with but one ovule. There are two to three styles or stigmas. The seeds are albuminous, and the embryo small. The flowers are in spikes, and are solitary in the axils of imbricate glumes or bracts.

The flowers are unisexual or bisexual in Cyperaceæ, bisexual in Gramineæ. In the former the perianth is absent or consists of bristles, occasionally of scales; in Gramineæ it is generally made up of very small scales.

Of this group we have included one species of the family Cyperaceæ. All have the grass habit, and constitute a greater part of the earth's vegetation than any other group of plants.

THE SEDGE GROUP.

Sedges like rushes, have a characteristic habit, resembling the grass habit, but more tufted, and make up a large part of the vegetation of marshy tracts, being also subaquatic.

There are some 2500 species included in sixty-five genera, and they are found in all parts of the world, but

especially in marshy tracts. They equal the grasses in Lapland, but as the equator is approached they decrease, and give place to Cyperus, etc.

The papyrus used for paper, boats, ropes, does not grow in the Nile now, but in Nubia locally. A sort of papyrus is made into matting in India, and a rope is made of *Cyperus textile.*

One distinction between a grass and a sedge is in the sheath, which is not split as in grasses, but entire.

In the Bullrush group the spikelets have no terminal flowers and are always bisexual and hermaphrodite, including Cyperus, Cotton Grass, Bullrush, Eleocharis, Fimbristylis (the last tropical). In the Sedge group the spikelets are unisexual or the flowers may be hermaphrodite and may be monœcious. The male and female flowers are on axes of different orders. They include Schœnus, Rhynchospora, Carex.

They have the grass habit with solid, angular stems, and often creeping rhizomes (the sand sedge by this means helping to bind the dunes together on the coast).

They are mainly perennial. The new shoot of each year is adnate to the parent stem. The aërial shoot is grass-like, the stem solid, with three ranks of leaves, and corms or tubers.

The leaves are narrow, tapering, wrapped round the stem in a complete sheath.

The flower is a spike or panicle or cyme, each unit

a spikelet, which consists of imbricate solitary bracts, the lower empty, enclosing glumes at right angles. The nodes have no diaphragms. The flower is in the axil of the glume, hermaphrodite or unisexual, naked, or with a perianth of six or more small scales or hairs. There are three stamens with three carpels, or two, with a single-chambered ovary. The stigmas are long and feathery, and the plant is (like the grass) pollinated by the wind. The single ovule is basal. The female flower in Carex is borne in a utricle. The fruit is an achene, and the testa does not adhere to the pericarp.

COTTON GRASS (*Eriophorum angustifolium*).

The Cotton Grass is always found in certain spots where the ground is boggy and there is a plentiful supply of moisture.

But though such tracts are now few and far between owing to drainage and tree-felling (though this last only affects it indirectly), Cotton Grass is found in most counties in the British Isles. In the Highlands it is found at the high altitude of 3500 ft.

The chief habitat of this and other Cotton Grasses is boggy ground, especially upland bogs fed by water from the numerous springs that issue from the outcrop. But these bog species are found not only at high elevations but also in the lowlands. To some extent they are associated also with marsh plants.

The Cotton Grass has the grass habit. The stems are single, terete, smooth, with two joints sheathed

(1), by fastening down with strips (adhesive music paper edging), (2) by pasting down upon the paper (cartridge, of sufficient strength, 17 by 11 inches, and stiff) and with strips as well. It is a defect of the latter method that plants crack thus treated. Each plant should have all the data, name, locality, habitat, altitude, soil, date, collector's name, and any other remarks written on a label.

GLOSSARY OF TERMS USED

Abortive.—Barren, of floral organs.

Achene.—A dry, one-seeded, indehiscent fruit.

Achlamydeous.—Wanting a perianth.

Acrid.—Burning, blistering.

Acuminate.—Terminating in a long, tapered point.

Acute.—When less than a right angle is made by two sides, as of a leaf.

Adherent.—United, of parts at first separate.

Adnate.—Attached throughout, as when the lobes of the anthers are attached to the filament.

Ala.—Wing, of corolla, in Leguminosæ.

Alternate.—When one member is not opposite another, as in leaves.

Anemophilous.—Pollinated by aid of the wind.

Angular.—Making an angle, as to the stem.

Annual.—Of plants that germinate, develop, and seed in one year, dying down in autumn.

Anterior.—That part of the flower next to the bract.

Anther.—The pollen-bearing termination of the stamen, borne on the filament, of two chambers usually.

Apetalous.—Wanting a corolla.

Apocarpous.—With the carpels free.

Appendage.—A part added to another.

Appressed.—Closely united to another part throughout the whole length.

Aril.—A fleshy integument or covering of the seed.

Articulate.—Jointed.

Astringent.—Having a contracting effect, of medicinal properties.

Autogamy.—Self-pollination.

Awn.—A bristle-like appendage, as in grasses.

Axillary.—In an axil.

Axis.—A line through the centre of a plant theoretically denotes this in position.

Bast.—The inner fibrous bark.

Beak.—The tip or extremity, usually long, of an organ.

Berry.—A succulent seed-vessel, with seeds enclosed in a pulp.

Biennial.—Plants that do not flower the first, but the second year, producing only leaves in the first, and after forming seed, die down at the end of the second year.

Bifid.—Divided into two parts halfway to the base.

Bilocular.—With two cavities in the cell or loculus.

Bipinnate.—When the leaflets on the secondary petioles of a doubly compound leaf are pinnate, and the secondary petioles are also.

Bisexual.—When the male and female flowers are on the same flower.

Bole.—The base of a trunk.

Bract.—A modified leaf on a flower-stem.

Bracteole.—Small bracts on the flower-stalk.

Caducous.—Falling early.

Cæspitose.—Tufted, close.

Calyx.—The outer whorl of the perianth, made up of sepals.

Campanulate.—Bell-shaped.

Capitate.—With a swollen extremity, or head.

Capitulum.—An inflorescence of several florets forming a head.

Capsule.—A dry dehiscent fruit, many-seeded, 1-, or more, celled.

Carina.—The two partly united petals in a pea, with a keel-like form.

Carpel.—The innermost of the sets of floral organs, when of one leaf, equal to the pistil, a single-celled ovary.

Caryopsis.—An indehiscent one-seeded fruit, in which the seed-coat is adherent to the pericarp, in grasses.

Catkin.—An inflorescence forming a pendulous spike, with flowers of one sex, there being bracts in the place of the perianth.

Caudicle.—A membranous process which supports the pollinia in an orchid.

Cell.—A chamber in a fruit or anther.

Chlamydeous.—Having a perianth.

Ciliate.—With stiff hair forming a fringe at the margin.

Circinate.—Enrolled, like the head of a crozier.

Clavate.—Club-shaped.

Claw.—The stalk of the petal, usually narrowed.

Cleistogamic.—Inconspicuous flowers, as in Violet, which do not open and are self-pollinated.

Column.—The united ring of filaments and style, in orchids.

Compressed.—Flattened lengthwise.

Concave.—Forming a hollow.

Connate.—United, as of leaves round a stem.

Connivent.—Converging or meeting in one point; arching over so as to meet.

Convex.—Forming a saddle.

Convolute.—Rolled up lengthwise, one edge overlapping the other.

Cordate.—Heart-shaped, as of leaves.

Coriaceous.—Leathery, tough.

Corm.—The bulbous base of a stem, as in Arum.

Corolla.—The whorl next the calyx in a flower, usually consisting of coloured petals.

Corymb.—When in an inflorescence the different branches bring all the flowers to the same level ultimately.

Cotyledon.—A seed-lobe or seed-leaf, usually temporary.

Crenate.—With rounded teeth on the margin of a leaf.

Cross-pollination.—When pollen from one plant is transferred to the stigma of a different plant.

Cruciform.—Arranged crosswise.

Cryptogam.—Of a plant that possesses no evident flowers, as in a phanerogam, the lower plants.

Cuneate.—Wedge-shaped.

Cupule.—A bract, cup-like, enclosing the nut in Amentiferæ.

Cuspidate.—Tapering gradually to a sharp point.

Cylinder.—Forming a ring from base to apex, as of anthers.

Cyme.—When an inflorescence bears a central terminal flower and lateral ones branch off, overtopping the former, definite; and centrifugal.

Cymose.—Disposed in a cyme.

Deciduous.—Falling ultimately.

Decumbent.—Lying on the surface, rising at the tip.

Decurrent.—Prolonged below the point of insertion with the base extending along the stem, as of leaves.

Decussate.—In alternate pairs, which cross at right angles.

Definite.—When the number of parts is invariably the same, or a multiple.

Deflexed.—Bent in a curve continuously.

Dehiscence.—The opening of a fruit or anther along a definite line.

Dehiscent.—Opening by a regular line or suture.

Dentate.—Toothed.

Denticulate.—With small teeth.

Dichasial.—When each fresh branch of an inflorescence bears on it two new branches, as in gentians.

Dichogamy.—When the anthers and stigma are mature separately.

Diclinous.—Unisexual; bearing the male and female flowers on different plants.

Digitate.—With narrow lobes excavated nearly to the base, like fingers.

Dimorphic.—Having two forms of flower, a device to ensure cross-pollination.

Diœcious.—When the male and female flowers are on separate plants.

Disc.—The central flat head of the receptacle which bears the florets in Compositæ, etc., or a fleshy staminiferous disc between stamens and pistil when the inner whorl of stamens is abortive.

Distichous.—In two rows, as the leaves in the Elm.

Downy.—With short close hair.

Drupe.—An indehiscent 1-celled fruit, fleshy exteriorly, hard within.

Drupel.—A small drupe, as raspberry.

Effuse.—Spread out.

Elaiosomes.—Nutritive parts of the seeds in broom and furze.

Elliptic.—Oval, and rounded at each extremity.

Embryo.—The plant in its earliest stage, before germination.

Endocarp.—A hard shell or stone.

Endosperm.—Tissue formed within the embryo-sac sometimes serving as reserve material for the embryo on germination.

Ensiform.—Sword-shaped.

Entomophily.—Pollination by aid of insects.

Epicalyx.—A stipular structure or sort of calyx in mallow, etc.

Epicarp.—The surface skin on a drupe, as in a cherry.

Epigynous.—When the outer members of the flower adhere to the ovary; and the upper parts appear to be seated on it, and the ovary is inferior, as in Umbelliferæ.

Epipetalous.—Growing on the petals.

Episepalous.—Growing on the sepals.

Equitant.—Folded around or over.

Exserted.—Projecting beyond.

Extrorse.—With the anther cavities turned away from the ovary; centrifugal.

Fertilisation.—When after pollination, pollen is enabled by the formation of a pollen tube to travel down the neck of the ovary into the ovule, and by conjugation with the ovum to form an embryo within the embryo-sac, resulting in Angiosperms in fruit-formation.

Filaments.—The anther stalks.

Filiform.—Thread-like.

Flaccid.—Bending, but not elastic.

Fleshy.—Succulent, as opposed to dry.

Flexuous.—Wavy.

Floret.—One of the flowers in a head or cluster.

Flower.—The short shoots that take part in the reproduction of the plant, consisting of male parts, andrœcium, female parts, gynæcium, and protective envelopes or outer perianth.

Flower-head.—An inflorescence.

Flower-stalk.—The stem bearing the flower.

Follicle.—A dry, dehiscent fruit, opening along the ventral suture, one-celled.

Free.—Not attached, as of the calyx lobes.

Fruit.—The seed-vessel, with seed and appendages.

Funnel-shaped.—Like an inverted cone.

Gamophyllous.—When the parts of the perianth are united or concrescent.

Gibbous.—Swollen at one end.

Glabrous.—Smooth.

Gland.—A secretory organ.

Glandular.—Possessing glands.

Glaucous.—Whitish-blue, not green.

Globose.—Globe-like, round.

Glume.—Bract-like scales or outer envelopes, often chaffy, found in Gramineæ.

Gynandrous.—When the style and stamens are united.

Hermaphrodite.—Having both sexes in the same flower, used in the same sense as bisexual by many botanists.

Hirsute.—With stiff hairs.

Hispid.—With long, rigid hairs.

Homogamous.—When the stamens and pistil are mature together.

Honey Gland.—Glands containing honey, at the base of the ovary as a rule.

Honey Guide.—Spots or other markings in flowers indicating the entrance to the flower and whereabouts of honey glands.

Honey Pit.—A cavity in which honey collects.

Hypogynous.—Of the flower when the receptacle is conical (with the ovary superior).

Illegitimate.—When pollination takes place between similar forms where there are long and short forms; little or no seed setting.

Imbricate.—Overlapping.

Incised.—Cut.

Incomplete.—With one or more of the organs wanting.

Incumbent.—When the radicle is not applied to the edges, but the back, of the cotyledon.

Indefinite.—Of stamens, etc., not of stated number.

Indehiscent.—Not opening along a suture.

Induplicate.—With the edges folded inwards in valve-like organs.

Inferior.—Below another organ.

Inflexed.—Curved inwards from outside.

Inflorescence.—The flower-head and its arrangement of parts.

Introrse.—Of anthers opening inwards, centripetal.

Involucel.—A partial involucre.

Involucre.—A whorl of bracts, below the flowers.

Irregular.—Unequal, unsymmetrical.

Labellum.—Lip, of a flower.

Lanceolate.—Lance-shaped, narrow, tapered to a point.

Latex.—Plant juice, frequently milky, as in the dandelion.

Laticiferous.—Containing milky juice.

Leaf.—Lateral appendages of the stem.

Leaflets.—In compound leaves the parts.

Legitimate.—Crossing between long and short or short and long forms of heterostylic flowers, resulting in fertile seed.

Lenticular.—Like a double convex lens.

Ligulate.—Strap-shaped.

Limb.—The flat expansion of a petal or leaf.

Linear.—Much narrower than long, and with parallel margins.

Lingulate.—Tongue-shaped.

Lobes.—A division, rounded as a rule, and projecting.

Loculicidal.—Opening along the back of the carpel.

Loculus.—A chamber or cavity in an ovary.

Lomentum.—A pod which splits up into 1-seeded partitions.

Long-stamened.—Of stamens which are in two series, long and short, usually the outer.

Long-styled.—Of di- or tri-morphic flowers where the style is long, and rises above the stamens.

Membranous.—Thin, partially transparent.

Mesocarp.—A mass of fleshy tissue between two other, inner and outer, coats of a seed-vessel.

Mid-rib.—The central vein in a leaf or main vascular bundle.

Monochasial.—When each fresh branch bears one only, successively, in a cyme.

Monochlamydeous.—With only one whorl in the perianth.

Monoclinous.—Of a hermaphrodite flower when male and female organs are in one flower.

Monœcious.—When male and female flowers are on the same plant.

Monopodial.—A racemose inflorescence in which the main shoot grows upwards, and lateral branches are borne with a flower at the apex.

Mucronate.—Bluntly terminated, with a sharp point.

Multiple.—Where one fruit is collectively made up of the ripened carpels of several flowers.

Nectary.—A honey gland.

Nerve.—Veins in a leaf, fibrous bundles which ramify in different ways.

Node.—The point in a stem where a whorl of leaves or a leaf is given off, often thickened.

Nut.—A hard 1-seeded indehiscent fruit.

Obcordate.—The inverse of cordate (*q. v.*), the attachment at the narrow end.

Oblique.—With the sides unequal.

Obovate.—The inverse of ovate (*q. v.*).

Obovoid.—The inverse of ovoid (*q. v.*).

Obtuse.—Blunt, making an angle greater than a right-angle (*cf.* acute, *q. v.*).

Offshoot.—Stems which strike a different direction from the main stem.

Opposite.—When similar organs are given off directly opposite, or on each side, of a common stem, etc., as of leaves.

Orbicular.—Nearly round.

Oval.—Elliptic, rounded at each end, twice as long as broad, as a rule.

Ovary.—The base of the pistil which encloses the ovules, and later, when fertilised, forms the fruit.

Ovate.—Egg-shaped, broader below the middle, flat.

Ovoid.—Egg-shaped, but solid.

Ovule.—An immature seed, equivalent to the megasporangia in Cryptogams, and which encloses the embryo-sac, or megaspore.

Ovum.—The unfertilised egg-cell (with the synergidæ forming the egg-apparatus formed of nuclei in the embryo-sac).

Panicle.—A loose cluster of flowers, branched.

Papilionaceous.—The form of flower found in the Pea, butterfly-like, with a vexillum or standard, two alæ, and the carina.

Papilla.—A wart-like projection.

Pappus.—The hairy limb of the calyx, equivalent to sepals.

Patelliform.—Disc-shaped, with a rim.

Pedicel.—An ultimate flower stalk.

Pedicellate.—Borne on a pedicel, not sessile.

Peduncle.—A main flower stalk, as often in a single-flowered plant.

Peltate.—Buckler-shaped.

Perennial.—A plant whose green parts, or leaves, die down to the stem base, but are renewed each year, or merely deciduous, as in trees.

Perianth.—The whorls of a flower, of calyx and corolla, applied when these are not distinct.

Pericarp.—The seed-vessel with the calyx adherent to it, or wall of an ovary that has become fertilised to form fruit.

Perigynous.—When the corolla or stamens are on the rim, and the carpels below but still called superior.

Persistent.—Remaining when other parts have fallen.

Petal.—A segment of the corolla.

Petaloid.—Of the sepals when they assume the characters of petals.

Petiolate.—Having a leaf-stalk.

Petiole.—Leaf-stalk.

Phyllaries.—The bracts or scales in an involucre.

Pilose.—With stiff but scattered hairs.

Pinnate.—With leaflets arranged on either side of a common petiole.

Pinnatifid.—When the segments of a leaf are nearly divided down to the midrib, sometimes twice or thrice divided.

Pistil.—The female part of a flower, composed of ovary and ovules, crowned by stigma and style (or more than one).

Pistillate.—A female flower, in unisexual flowers, or one having no stamens.

Pith.—The cellular central portion of a root, or stem, or branch, sometimes wanting.

Placenta.—That part of the carpel from which the ovules spring.

Plumule.—The ascending rudimentary shoot in the embryo.

Pod.—A one-celled seed-vessel with two valves, or legume.

Pollen.—The dust or contents of an anther, dry or granular, or combined in a mass and waxy (pollen-mass, as in orchids).

Pollen-grain.—A pollen cell, or microspore.

Pollen-sac.—A microsporangium in which the pollen-grains are developed.

Pollination.—The process by which pollen is conveyed from the anthers to the stigma.

Polygamous.—When male, female, and hermaphrodite flowers occur on the same plant, as in the Ash.

Polypetalous.—With several distinct petals.

Polysepalous.—With several distinct sepals.

Pome.—A fleshy many-celled compound fruit, as in the Apple, where the ovary is inferior.

Posterior.—The portion of the flower near the axis.

Proterandrous.—When the anthers mature first.

Proterogynous.—When the stigma matures first.

Pubescent.—Downy, with closely appressed hairs.

Punctate.—With minute pin-holes.

Pungent.—Strong.

Pyxis.—A capsule opening by a lid, as in *Anagallis*.

Quadrangular.—Square, of stems.

Raceme.—An indefinite inflorescence with flowers borne on pedicels, centripetal.

Racemose.—In a raceme, with stalked flowers.

Rachis.—The central stem of an inflorescence.

Radical.—Springing from the root.

Radicle.—The root of an embryo, associated with the hypocotyl.

Ray.—The ring of outer florets, or branch of an umbel.

Rayed.—Formed in a ray or ring.

Receptacle.—A part bearing the flowers; the expansion of the apex of the peduncle.

Recurved.—Bent back moderately.

Reflexed.—Curved back considerably.

Regular.—Uniform, symmetrical.

Reniform.—Kidney-shaped.

Reticulate.—Net-like.

Retuse.—Blunt, with a central notch.

Revolute.—Rolled back.

Rhipidium.—A form of cyme.

Rhizome.—An underground creeping stem.

Rimose.—Cracked.

Root.—That part distinct from the shoot, serving to attach the plant, and draw nutriment from the soil.

Rootlet.—A secondary root, given off from a main root.

Rootstock.—A rhizome, or tuber.

Rotate.—Wheel-shaped.

Rugose.—Rough, wrinkled.

Runcinate.—With the lobes recurved towards the base.

Runner.—A thin trailing branch, rooting at intervals as in the Strawberry.

Sagittate.—Arrow-shaped.

Samara.—A winged indehiscent fruit, as in Maple or the "key" of the Ash.

Scale.—Small rudimentary leaves.

Scape.—A naked flower-stalk springing from the crown of a root.

Scarious.—Membranous, dry, thin, not green, semi-transparent.

Schizocarp.—A fruit with numerous carpels, which splits up into 1-seeded portions.

Secund.—All turned one way.

Seed.—An ovule that has been fertilised and is mature.

Seed-vessel.—Or fruit.

Segment.—*A portion of a divided leaf, calyx, etc., or lobe.*

Self-pollination.—When pollen from the anthers of a plant is transferred to the stigma of the same plant.

Semi-sagittate.—Half arrow-shaped.

Sepaloid.—Resembling a sepal.

Sepal.—The segments of a calyx.

Septate.—Having septa or partitions.

Septicidal.—When the septa of a fruit are split down the middle.

Serrate.—With saw-like teeth.

Serrulate.—With small saw-like teeth.

Sessile.—Not stalked.

Setaceous.—Bristle-like.

Sheath.—The lower part of a leaf or leaf-stalk enveloping the stem.

Shoot.—The stem and leaves.

Short-styled.—A form in which the style is short and the anthers above the stigma.

Sigmoid.—Shaped like an **S**.

Simple.—Not branched or compound.

Silicula.—As broad as long, like a siliqua.

Siliqua.—A dry pod with two valves with an internal transverse membrane.

Sinuate.—Wavy, of the margins of leaves.

Sobole.—Subterranean, thin creeping stem; an underground stole.

Spadiceous.—Forming a spadix or succulent spike with sessile flowers.

Spathaceous.—Having a spathe enclosing a spadix.

Spathulate.—Spoon-shaped.

Spike.—A long indefinite inflorescence with sessile flowers.

Spikelet.—A cluster of flowers enclosed in a glume.

Spinose.—Bearing spines.

Sporophylls.—Stamens in phanerogams.

Spur.—A tubular expansion of the flower.

Stamens.—The pollen-bearing part of the flower, bearing filaments and anthers, collectively an andrœcium, and equal to microsporophylls.

Staminate.—Of a flower in which only stamens occur; a male flower.

Staminode.—A scale within the upper lip in *Scrophularia*.

Standard.—The upper posterior petal, unpaired in the Papilionaceæ.

Stellate.—Star-like, radiating from a centre.

Stem, or shoot, aërial or underground.

Stigma.—The portion of the pistil, usually uppermost, upon which pollen is deposited.

Stipitate.—Stalked.

Stipule.—Paired leaf-like appendages at the base of the leaves or leaf-stalk.

Stole.—A loose trailing stem, with buds, which take root at intervals.

Stoloniferous.—Bearing stolons.

Stone.—A hard part of a fruit.

Style.—That part of the pistil between the ovary and the stigma.

Subcordate.—Nearly heart-shaped.

Suberect.—Nearly erect.

Subulate.—Awl-shaped.

Succulent.—Juicy, not dry.

Sucker.—A shoot which springs from an underground stem.

Sulcate.—Furrowed.

Superior.—Above, as of an ovary when free from the calyx.

Suture.—A line of junction between two organs that dehisce.

Sympodial.—A type of cymose inflorescence.

Sympodium.—The type of branching where the lateral branches overtop the main axis as in a cymose inflorescence.

Syncarpous.—When the carpels are united to form a fruit.

Tendril.—A thread-like, twisted organ, assisting plants in climbing, as in vetches.

Tense.—Not turgid or swollen.

Terete.—Nearly round transversely.

Ternate.—In threes, two lateral, one terminal, of leaflets.

Testa.—An integument, the outer coat of a seed.

Thalamus.—The receptacle of a flower.

Tomentose.—Felted.

Torus.—The receptacle of a flower.

Trifid.—Divided halfway into three.

Trifoliate.—With the leaflets in threes.

Trilobed.—With three lobes or divisions.

Trimorphic.—Having three forms of flower.

Triquetrous.—With three angles.

Tube.—A tubular structure formed by cohesion of parts.

Tuber.—A thick fleshy underground stem.

Tumid.—Swollen.

Umbel.—An inflorescence in which a cluster of stalked flowers springs from a common point.

Undulate.—Wavy.

Unilateral.—Arranged along one side.

Unilocular.—Having one loculus or chamber.

Unisexual.—Flowers with stamens or pistils, not both.

United.—Not free.

Utricle.—A bladder-like covering, or envelope, as in sedges.

Valve.—The parts into which a capsule breaks, or the flap of an anther.

Valvular.—United by the margin only.

Ventral.—Of sutures, opposed to dorsal.

Versatile.—Turning freely.

Vexillum.—The standard in a papilionaceous flower.

Villous.—With loose, fine hair.

Vittæ.—Narrow, long, oil receptacles.

Whorl.—A ring of organs ranged about a common axis.

Wood.—The hard part of the vascular tissue or xylem, with tracheids, woody fibre, and parenchyma.

Zygomorphic.—Flowers symmetrical about one plane only, as opposed to actinomorphic—symmetrical about any plane.

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